UNDERSTANDING THE ROLE OF NEIGHBORHOOD CONTEXT AND INDIVIDUAL DIFFERENCES ON TIME TO RECIDIVISM: THE CASE OF JUVENILE DELINQUENCY

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Christina Alicia Campbell

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ABSTRACT

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Understanding neighborhoods and individuals hold the promise of providing a more comprehensive perspective of the development and experiences of juvenile offenders. Through the adoption of tools, like juvenile offender risk assessment instruments, juvenile courts have the potential to understand how offenders' criminogenic behaviors vary as a function of their neighborhood context. The purpose of this exploratory study was two-fold. First, this study examined differences in juvenile offenders (N=893) recidivism based on the type of neighborhood the juvenile lived in at the time of his/her first offense, while controlling for individual-level and proximal risk factors known to predict delinquency (i.e. race, gender, and risk type). Rates of recidivism were compared across three types of neighborhoods (i.e. Distressed, Resilient, and Benchmark). Each neighborhood type represented the socio-economic conditions of the neighborhood as determined by archival US Census data. Second, this study examined the moderating effect of neighborhood type on risk and recidivism. A multilevel Cox Proportional Hazard Model revealed that when controlling for individual characteristics (i.e. risk group, race, and gender) recidivism did not vary by neighborhood type. Additionally, neighborhood type did not significantly moderate the relationship between risk and recidivism. Implications of these findings are discussed.

This is dedicated to my mom, Sheree Campbell.

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Chapter 1: Introduction

Research suggests that understanding delinquency is contingent on the ability to measure the multiple ecological levels that impact juvenile offenders (Onifade, Petersen, Davidson, & Bynum, 2011). By capturing individual-level and neighborhood-level characteristics, courts have the potential to gain a comprehensive perspective on the developmental processes and experiences of juvenile offenders (Onifade, et al., 2011; Grunwald, Lockwood, Harris, & Mennis, 2010; Sampson, Morenoff, & Gannon-Rowley, 2002; Levanthal, Brooks-Gunn, 2000; Morenoff & Earls, 1999). The adoption of juvenile offender risk assessment tools, which attempt to measure individual behaviors, have allowed juvenile courts to observe recidivism/reoffending. However, the degree to which risk for recidivism varies by specific demographic groups is still unclear (Onifade, Davidson, Campbell, 2009 & Schwalbe, Fraser, Day, Cooley, 2006). The study reported here combined individual level risk assessment data and neighborhood level characteristics to understand recidivism from an ecological perspective.

Although it has been argued that risk assessment instruments have improved case management and judicial decision-making, these instruments have been shown to exhibit differential predictive validity across subgroups as a function of socio-economic status, race, and gender, often leading to false positive crime predictions for marginalized groups (Onifade, Petersen, Davidson, Bynum 2010; Onifade, Davidson, Campbell, 2009; Schwalbe, Fraser, Day, Cooley, 2006; & Pratt & Cullen 2005). Differential predictive validity also appears to vary across neighborhood context (Onifade, et al., 2011; Onifade, Davidson, Campbell, 2009; Schwalbe, Fraser, Day,

Cooley, 2006; & Pratt & Cullen 2005). Given the validity of risk assessments is unclear, these assessments warrant further investigation.

The research reported here is a preliminary investigation. Implications of this research will lead to the validation of risk assessment across neighborhoods, the expansion of theories concerning what types of neighborhoods lead to lower recidivism and suggestions for the development of appropriate prevention and intervention protocols that reflect the multilevel nature of juvenile delinquency. Reducing the likelihood of recidivism depends on the ability to understand the etiology of crime and appropriately measuring crime is vital to improving interventions that reduce and prevent recidivism.

This dissertation provides an overview of juvenile delinquency, several definitions of juvenile delinquency, followed by a review of prominent theories of juvenile delinquency. In addition, the current research study described is followed by methods, results, discussion and conclusions.

Chapter 2: Literature Review

Juvenile Delinquency Defined

Many different definitions of juvenile delinquency have been used over time. However, for this dissertation, delinquency was defined as *any criminal or illegal behavior committed by an individual under the age of 17 resulting in a petition to juvenile court* (age 17 being the statutory age limit for the state in question). The concept of "delinquency" is a legal construct defined by state statute (Bynum & Thomas, 2005). The term "official delinquency" is recorded once a juvenile has been arrested and referred to the court system due to allegations of participating in some criminal act.

Juvenile Delinquency: A Social Issue

According to the Center on Juvenile and Criminal Justice (2012), juvenile delinquency has steadily declined over the past 10 years. However, when examining these patterns by gender, rates of delinquency among female offenders has not only declined at a slower rate overall, but has risen simultaneously for aggravated assault, vandalism, and drugs (OJJDP, 2011; Javdani, Sadeh, & Verona, 2011). In addition to this gender disparity, racial disparities are also apparent (OJJDP, 2011). For example, although Black juveniles make up only 16% of the general population, they represented a staggering 51% of juvenile court cases (OJJDP, 2011). Even with the overall decline in delinquency, there still exists a serious need for courts to further investigate issues of delinquency.

To adequately predict who might reoffend, some juvenile courts rely on prediction tools, commonly referred to as "risk assessment tools". These risk assessment tools were developed to sort and categorize juveniles based on the likelihood of reoffending and highlight those juveniles with intervention needs (Puzzanchera & Sickmund, 2008;

Schwalbe et al., 2006). Ideally, the adoption of risk assessments helps filter juveniles out of the court system if they have a low probability of recidivating. Instead, there seems to be additional unidentified and identified mechanisms, beyond risk assessment scores, which contribute to the number of juveniles who come in contact with the courts, the number of cases being processed, and the rate of those who recidivate (Puzzanchera & Sickmund, 2008; Schwalbe et al., 2006). The inability of the current risk assessment tools to solely measure criminogenic risk, suggests that the accuracy of the assessment tools may be faulty. These tools must provide an improved delivery system that allows courts to better sort juvenile cases, resulting in better allocation of resources to individuals exhibiting the greatest need. However, risk assessment instruments have failed to maintain reliability and validity across specific groups and there remains some disconnect between the assessment of risk and patterns of delinquency.

In order for courts to properly address the current disparities and intervention needs of juvenile offenders, there is a need to further understand how the etiology of crime varies by group membership (Onifade et al., 2008). It is equally important for courts to determine which juveniles are most at risk for delinquency in order to focus their efforts on those who exhibit high intervention needs. Currently, juvenile courts are having difficulty distinguishing juveniles who have high intervention needs (Olver, Stockdale, Wong, 2011). Finding the best method to identify these individuals remains a lofty goal of the juvenile courts.

The inability to properly sort juveniles according to their true intervention needs has led to increased spending and over-allocation of resources to juveniles who do not

exhibit true risk for recidivism (Onifade, Petersen, Davidson, Bynum, 2010). Previous research on this issue found that only a small proportion (8%) of juvenile offenders is responsible for repeat offending (Schumacher & Kurz, 2000). In response to this small percentage of risky offenders, juvenile court personnel have focused on the identification of these juveniles during the early stages of the court process (OJJDP, 2011). This strategy is contingent on a court's ability to accurately identify and predict pathways of delinquency. Furthermore, it is not only important for risk assessment tools to adequately and consistently identify high risk juveniles (Schumacher & Kurz, 2000), but it is also important to investigate the potential of a cross level interaction between individual risk and the environment (Onifade et al., 2011).

Capturing the comprehensive nature of crime is essential because current risk assessments are person-centered and focus on individual-level and proximal risk factors. To date, these tools have only accounted for a relatively minor proportion of recidivism (Onifade et al., 2011). It may be that macro-level factors, such as neighborhood context, play a critical role in determining who will or will not reoffend. Hence, there is a need to further investigate the differential predictive validity across neighborhoods to further determine if neighborhood significantly affects rates of recidivism (Onifade et al., 2011). This is especially important given that the *Youth Level of Service Case Management Inventory (YLS/CMI)* misclassifies resilient juveniles who likely come from low-income environments (Onifade et al., 2011). Although the Onifade, et al. (2011) research focused on current concerns regarding the need to attend to distal factors which impact delinquency, this early work has yet to control for individual-level factors (e.g. gender, race, and criminogenic risk) that matter in the prediction of

future crime. In addition, it did not specify whether youth nested within specific neighborhoods have differential rates of recidivism. These issues are examined in the current study.

Benefits of Studying Crime

Some advantages of understanding the etiology of crime include not only theoretical clarity but the potential for saving scarce resources. By understanding the long-term multilevel nature of offending, courts are better able to properly use resources for juveniles who pose a greater risk to communities. Previous research found that by identifying and focusing on youth who have the greatest needs, courts will not only realize significant long-term savings (approximately $2.3 to $2.5 million per juvenile), but also provide more appropriate treatment (Fass & Pi, 2002; Cohen, 1998). While these findings provide some evidence that reduction in costs is advantageous, addressing these fiscal concerns is most likely contingent on our accurate understanding of theories of delinquency.

To date, the extent to which courts understand the meaning of risk as it relates to proximal and distal factors which holistically impact criminal offending is unknown. Since there are multilevel theories concerning the etiology of crime, there must also be risk models to capture these multilevel components (Luke, 2005). The review discussed below explored common theories of crime as they related to the individual, micro-level, and macro-level influences on offending.

The Exploration of Individual-Level Characteristics and Behavior and Crime

Individual-level explanations of crime attempt to link biological/genetic and psychological variables to specific behaviors and outcomes. Often these explanations

consider the juveniles as the primary actor in criminal offending. The theories which focus on individual-level characteristics were utilized to investigate delinquency and model criminogenic intervention needs. The ways in which the aforementioned variables relate to current juvenile risk assessments were considered as well.

Personality and Developmental Characteristics. Personality theorists developed constructs to represent those who appeared to have a "flawed personality" as a means to further expand our understanding of criminal offending (Hare & Neuman, 2009). The most prominent of these conceptualizations surrounded "psychopathy" or "sociopathy" (Hare & Neuman, 2009). The study of psychopathology expanded the etiology of delinquency by establishing labels that characterized criminal offenders such as excessive lying, hyperactivity, and egocentric thoughts (Bynum &Thompson, 2005; Hare & Neuman, 2009). While the origins of the term "psychopathy" initially had an individual-level focus, by the 1960's and 1970's, a shift in research studies sought to broaden such characterizations of criminal thinking and behavior (Bynum & Thompson, 2005). As a result, the term "sociopath" was introduced to not only explain the personality condition of an individual, but also to consider how offenders were socialized within the broader society (Hare, 1999). Even with the acknowledgement of the impact of social norms and society, much of the psychological explanations of crime involved the individual's inability to conform within the social systems and places the individual as the primary agent of criminal activity (Hare & Neuman, 2009).

There are two classic schools of thought concerning the source of personality and how it impacts behavior. One school of thought is the Intrinsic Maturation Perspective, which suggests that biology/genetics shape personality and serves as the

primary source of individual behaviors (McCrae, et al., 2000). The other school of thought is the Lifespan Perspective, which argues that personalities are formed as a result of their social environments (Roberts, 2006). Taken together, these perspectives become important when attempting to identify the source of criminogenic and/or antisocial behaviors. To explore these two schools of thought, researchers have studied twins, siblings, and adoptions to further examine link between genetics and personality and links between unshared environments and personality (i.e. Hopwood et al., 2011; Rhee & Waldman, 2002).

In a meta-analysis which examined the genetic and environmental link across 51 twin and adoption studies, Rhee and Waldman (2002) found that non-shared environments was one of the strongest factors that explained differences in antisocial behavior. They also found that age had a significant moderating effect between genetics and the environment (Rhee & Waldman, 2002). These observations have been replicated in additional studies that examined the impact of environmental context and age on developmental pathways to antisocial behaviors and have suggested that an individual's environmental context is one relevant element to understanding behavior (Hopwood et. al, 2011; Moffitt, 2005).

Piquero (2008) reviewed 80 studies examining the life course of developmental trajectories of criminal behavior and concluded that juvenile delinquency did not extend into adulthood, but peaked during adolescence and decreased as juveniles approached adulthood. One explanation for the decrease in delinquency is that shifts in environmental (career) and contextual (new family roles) promoted "responsible" or "law abiding" behaviors. As the juveniles grew older, their environments became more

dissimilar, allowing additional non-genetic factors such as parenting, peer-networks, relationships/marriages etc. to influence development (Laub & Sampson, 2001). Having found a significant link between how different contexts impact behavior patterns, a unilateral genetic connection is difficult to evaluate even among separated twins (Joseph, 2001). In other words, social conditions play a key role over the life course of all individuals. Hence, it may be beneficial to consider how psychological and sociological pathways coexist to further understand the nature of crime and how various familial environments shape adolescence-to-adulthood outcomes as they are related to juvenile delinquency.

More recently, Hopwood et al. (2011) examined the relationship between genetics and environmental influences on changes in higher order personality traits of twins to understand the etiology of personality development as adolescents entered adulthood. In this longitudinal study of a sample of same-sex male and female identical and fraternal twins averaging 17 years old, they reported that while genetics explained traits that remained stable, non-shared environments between twins significantly accounted for personality changes over time (Hopwood, 2011). This means that as twins aged and experienced different social environments, the behavior and personality changes they exhibited were more likely a function of environmental context. These observations were especially significant during the second wave of the study. However, by the third and final wave of the study the change effects as related to how social environments explained different behavioral outcomes disappeared (Hopwood, 2011). This study, like the earlier studies, suggests that understanding how environments and social experiences shape individuals becomes extremely important, especially at

specific stages in an individual's life (Hopwood, 2011). This study also suggests that the environment becomes an essential predictor or indicator of specific personality traits and changes in behavioral patterns over time (Hopwood, 2011).

In addition, further research has identified time and age as factors that matter significantly when attempting to understand the social experiences and development of individuals. Moffit (2006) suggested that early-onset of delinquency potentially leads to antisocial behaviors in adulthood based on criminal neurological deficits (Moffitt, 2006). On the other hand, for juveniles who became involved in criminal activity during adolescence, Mofitt (2005 & 2006) suggested that an environmental influence, like friendship, may be more important. While genetic links seem to be more closely tied to those with long-term criminal histories, biological models have become more useful in explaining pathways that are contingent on the early-onset of conduct disorder.

Past research has focused on the links between crime, developmental structures, and traits like conduct disorder have been beneficial in modeling criminogenic risk (Mofitt, 2006). Nonetheless, some of this research has been deemed inconclusive concerning these linkages and/or been found to be age-specific (Moffitt, 2005). Despite these issues, researchers have relied heavily on individual-level theories to develop risk assessment models to capture behaviors, attitudes, and personality traits characterized by conduct disorder (Onifade, Davidson, Campbell, 2009; Onifade et al., 2008; Schwalbe et al., 2006; Hare, 1999 &1990; Hoge & Andrews, 1990). For example, research has found that specific personality traits (inflated self-esteem), behaviors (physically aggressive), attitudes (antisocial/callous) and orientations (rejecting help) significantly predicted future criminal offending and were useful target areas to focus on

when attempting to reduce recidivism (Onifade, Davidson, Campbell, 2009; Onifade et al., 2008; Schwalbe et al., 2006; Hare,1999 &1990; Hoge & Andrews, 1990). Consequently, these constructs have been further utilized in well-known juvenile risk assessment instruments to predict crime (Hoge & Andrews, 1990). And similar to the personality and developmental trends observed in the aforementioned research, individual-level demographic variables such as race and gender have also been helpful in understanding patterns of delinquency.

Other Demographic Characteristics. Race and gender are two important demographic variables that have been related to recidivism (Piquero, 2008). Piquero (2008) suggested that that specific demographic groups provided an additional dimension for understanding the trajectory of crime and should be accounted for to understand patterns of offending. Furthermore, prior studies have suggested that models of recidivism vary by demographic characteristics such as race and gender. (Onifade, Davidson, Campbell, 2009; Piquero, 2008; Taxman, Byrne, & Pattavina, 2005; Peeples & Loeber, 1994). Not only do these variables describe individuals, they are also useful in shedding light on the social experiences which influence recidivism (Onifade, Davidson, Campbell, 2009; Onifade et al., 2008).

Race. Studying delinquency as a function of race has been explored for many years. Many studies have reported disproportionate rates of recidivism among minority offenders (Kalmalu, Clark, & Kalmalu, 2010; Onifade, Davidson, Campbell, 2009; Sabol, Minton, & Harrison, 2007). While, some researchers have relied on racial trends to suggest a causal effect between individuals and crime (Bynum & Thompson, 2005), others have argued that such links are a function of environmental conditions or

disparity in the criminal justice system (Onifade et. al, 2010; Wikstrom & Sampson, 2003; Levanthal & Brooks-Gunn, 2000; Jencks & Mayer, 1990). For this reason, the social concept of race must be attended to when striving to understand delinquency.

Peeples and Loeber (1994) explored racial differences and offending to examine how neighborhood context impacts delinquency. This study examined 506 urban male juvenile offenders and found that after comparing African American youth to their White counterparts across neighborhood contexts, African American males were more likely to come in contact with the justice system (Peeples & Loeber, 1994). The results also showed that when they lived in "non- underclass" areas, African American offenders had similar rates of delinquency as their White counterparts (Peeples & Loeber, 1994). Additional research has consistently confirmed similar findings, suggesting that neighborhoods play a significant role in patterns of risk and delinquency (Onifade, Peterson, Davidson, & Bynum, 2011; Wikstrom & Sampson, 2003; Leiber & Mack, 2003). These studies have suggested the experiences of juveniles within neighborhoods vary by race and that minorities who live in disadvantaged neighborhoods are more susceptible to recidivism. To the contrary, other research suggests that when minorities have the opportunity to access neighborhoods that have more social and economic capital, they do significantly better and have higher levels of functioning more similar to their White counterparts (Onifade, et al. 2011; Schwalbe, Fraser, Day, Cooley, 2006; Bynum & Thompson, 2005; McKay, et al. 1969).

Research concerning the relationship between race and environment has exposed various trends within the justice system. One study in particular, Jung, Spjedens, and Yamantani (2010) found that Minorities recidivate faster than Whites. In

a study that examined survival time to recidivism and race among an adult male population, results showed that not only was there a higher rate of recidivism among minority offenders but they also recidivated within a shorter period of time compared to their White counterparts (Jung, Spjedens, &Yamantani, 2010). Time to recidivism was significant even after controlling for the length of time in jail and the age of the offender upon release (Jung, Spjedens, &Yamantani, 2010). Positive correlations between race and crime suggest that more in depth research is crucial to exploring how these demographic properties may enhance our understanding of the factors that result in a longer survival time to recidivism. Like race, attention should also be given to understanding the role gender plays in our understanding of delinquency.

Gender. Various studies have provided diverse explanations concerning the relationship between gender and crime. These explanations range from trying to capture the biological component, which explores hormone levels and/or the evolution of traits (Cross, Copping, & Campbell, 2011), to attempting to acknowledge context differences reflected in how boys and girls are socialized (Javdani, Sadel, Verona, 2011). It has long been debated whether gender is a reflection of nature, of nurture or perhaps both.

Cross, Copping, and Campbell (2011) published a meta-analysis which examined sex differences in impulsivity across 271 studies (n = 741 effect sizes). They found that males reported high rates of sensation-seeking and risk-taking, which made them more likely to exhibit aggressive behavior and participate in more analogous behaviors than their female counterparts (Cross, Copping, and Campbell, 2011). One explanation for this finding was the “evolutionary perspective” which suggests that

nature and genetics are responsible for and reflected in the way individuals behave (e.g. aggressive male chimpanzees) (Cross, Copping, & Campbell, 2011). On the other hand, these explanations fail to explain the recent peaks in female offending since no concurrent biological explanations have been proposed (OJJDP, 2011). While such research highlights the biological differences between males and females based on different levels of aggression (e.g. higher levels of testosterone), the exclusion of non-biological factors eliminates the potential for social forces to be considered in models of delinquency.

Other studies have shown that context matters when understanding offending patterns across male and female groups (Schwalbe, Fraser, Day, Cooley, 2006; Leiber & Mack, 2003). These contextual factors are evident in differential rates of offending across male and female subgroups and differential treatment and disposition outcomes (Schwalbe, Fraser, Day, Cooley, 2006; Leiber & Mack, 2003). For instance, Leiber and Mack (2003) examined the main effects and interactions between race, gender, and family context as a means to understand differential treatment in the court system, specifically in the decision-making/dispositional process. They found that, while race impacts court processes and outcomes independent of gender more for African Americans, gender effects mattered more for Whites (Leiber & Mack, 2003). Gender mattered most among White female offenders and led to more lenient outcomes than for both their male and Non-White counterparts. This finding was particularly true for females from single-parent homes (Leiber & Mack, 2003).

Furthermore, additional studies have also highlighted that family context contributes to gender differences observed among delinquent populations (Kroneman,

Loeber, & Hipwell, 2004). Researchers have found that family circumstances and parenting play a key mediating role in understanding the role of gender and future offending (Loeber, 1995; Farrington, 1992; Larzelere & Patterson, 1990; Hoge & Andrews, 1990; Jencks & Mayers, 1990). Since the socialization of males and females differ (Javdani, Sadeh, Verona, 2011), such findings show evidence that models of recidivism should not be limited to biological explanations but also reflect the influence of neighborhood context (Schwalbe, Fraser, Day, Cooley, 2006; Bynum & Thompson, 2005; Leiber & Mack, 2003).

The examination of neighborhood context and gender is beneficial to understanding models of delinquency. For example, Zimmerman and Messner (2010) found that the gender gap in rates of offending decreased among juveniles exposed to high rates of neighborhood disadvantage. On the other hand, gender gaps were more prominent within areas with increased resources (Zimmerman & Messner, 2010). They also observed that peer relationships had a significantly higher effect on girls' participation in offending more so than their male counterpart (Zimmerman & Messner, 2010). Neighborhoods seem to impose strong effects on criminal offending and that microsystems, like peer groups, impact males and females differently.

The Exploration of Social Control, Micro-Level, and Macro-Level Explanations of Crime

Social Control Theory. Social Control Theory has also been discussed as an individual characteristic and a contextual characteristic. For organizational purposes, it is discussed in this section.

Social control theory describes the extent to which individuals are bonded to and connected with people, community, and social norms. Based on this theory, when

juveniles are committed to social groups (family) and institutions (school, church, and employment) these interactions and bonds serve as protective factors or deterrents to crime. Gottfredson and Hirschi (1990) proposed that criminal activity provides immediate gratification and is a response to innate desires. However, when individuals have high levels of control and strong bonds with pro-social environments, these individuals are more likely to exercise self-control and abide by conventional norms (Gottfredson & Hirschi, 1990). Social controls have also been linked to the results of an internal cost benefit analysis of rewards and punishments. This theory takes into account external pressures primarily among an individual's microsystem (i.e. peers, family, school mates etc.) that directly impact development.

Pratt and Cullen (2000) conducted a narrative review concerning social bonding and social control theories to better understand how low control leads to difficult behaviors. Pratt and Cullen (2000) found (across 21 studies which yielded 126 effect sizes) that low self-control was a predictor of illegal behaviors such as driving fast, smoking, drug use, etc. Moreover, when controlling for social control variables, social learning/differential association variables, defined by juvenile modeling and associating with those involved in deviant behaviors, were statistically significant in predicting criminal behaviors independent of social control variables (Pratt & Cullen, 2000). In their conclusion, they cautioned that while social control theories were useful in understanding behaviors, it was essential not to overestimate the impact of such social controls (Pratt & Cullen, 2000). Such research supports the notion that both individual characteristics and his/her microsystems provide useful information concerning behavior.

Micro-environmental explanations. A juvenile's microsystem is composed of various social networks (e.g. family and peers) and organizations (e.g. school). Microsystems have been included in juvenile risk assessments because of their relationship to criminal involvement. Some of these micro-level factors that predict recidivism include family circumstances, education, peer, and leisure activities (Javdani, Sadeh, & Verona, 2011; Onifade et al., 2008, Schwalbe et al., 2006; Hoge & Andrews, 1990). Researchers have already established that not only do micro-level factors help to describe a juvenile's intervention needs, but, they also help predict future crime by focusing on immediate relationships, like peers and family.

Families are critical microsystems that impact the development of youth (Denning & Homel, 2008; Schmidt, Hoge, & Gomes, 2005; Cottle, Lee, Heilburn, 2001; Andrews et al., 1990). Family factors, such as parent maltreatment, quality of relationship with parents, lack of supervision, single-parenting, and familial problems have all been significantly associated with future offending (Denning & Homel, 2008; Schmidt, Hoge, & Gomes, 2005; Cottle, Lee, Heilburn, 2001; Andrews et al., 1990).

Since single-parent households have been identified as one of the factors associated with recidivism, research has focused on the impact of family composition on criminal behavior. Wells and Rankin (1991) conducted a meta-analysis involving 50 studies that examined the relationship between single-parent homes and delinquency. They found that when comparing families with two parents versus one parent, juveniles from one parent homes were 10 to 15% more likely to engage in status offenses (e.g. truancy) than juveniles who were from two parent households (Wells & Rankin, 1991).

Moreover, Anderson (2002) looked at school as a context to examine the relationship between family structure and delinquency. Anderson (2002) concluded that juveniles from single-parent households who were surrounded by a high proportion of juveniles from single-parent homes exhibited higher rates of delinquency (Anderson, 2002). Not only did being from a single-parent home put juveniles at risk, they were at greater risk if their peers were also from single-parent homes. Additionally, given trends like strong relationship with father/mother and/or appropriate disciple/supervision are associated with crime rates, the parent/child relationship remains a topic worthy of further examination (Onifade et al., 2008; Hoge & Andrews, 1990).

Similarly, Jencks and Mayers (1990) concluded that family provides one of the strongest contexts for children who are highly influenced by their parents' behaviors, actions, attitudes, and values. In addition, these researchers found that parental supervision and the parent's ability to provide structure for their child are key contributors to establishing strong social control during that child's development (Farrington, 1992; Jencks & Mayers, 1990; Larzelere & Patterson, 1990). Fortunately, these risk factors are often utilized when measuring a juvenile's risk for future crime. For example, Onifade et al. (2008) focused on the criminogenic risk of male and female juvenile probationers to determine if there were specific types of offenders who lived within a particular mid-western county. After conducting a cluster analysis on the different risk areas on the Youth Level of Service/Case Management Inventory (YLS/CMI), Onifade et al. (2008) found that there were five specific types of offenders within the county. A unique moderate-risk group of offenders with high levels of family needs emerged from the data. In addition, this group had a different rate of recidivism

than the other moderate-risk group (Onifade et al., 2008). Not only did this cluster typology exhibit differences in recidivism rates compared to other groups, but further confirmed the strong influence of families on certain types of juvenile offenders.

Similar to research examining the impact of family, juveniles involved in positive social networks and interactions report positive social bonding experiences (Hirschi, 1969). Juveniles who participated in organized activities, had personal interests, and made good use of their time were found less likely to come in contact with the juvenile justice system (Hoge et al., 1996). Positive social activities served as a protective mechanism toward deterring juveniles from participating in offending. Youth who were involved with organized activities and hobbies and engaged in positive peer relationships had reduced rates of recidivism (Onifade, et al., 2008; Hoge et al., 1996).

Analyzing peer networks is another approach to understanding juvenile delinquency. Nevertheless, the level of impact peers have on delinquency may also be contingent on neighborhood context. Lowe, May, and Elrod (2008) explored theoretical predictors of juvenile offending using their microsystems in school and neighborhood. This self-report study used delinquent peer relationship scales to determine how a juvenile's peer group, attachment to school, experience with stressors at home, and reports of victimization, impacted engagement in juvenile delinquency (Lowe, May, & Elrod, 2008). Juveniles with delinquent peers felt less attached to their school and reported experiencing high stressors at home (i.e. unemployment, illnesses, and family problems). Juveniles with delinquent peers were more likely to have engaged in delinquency both in and out of school. Moreover, these results varied by gender. These proximal factors provided evidence to suggest that microsystems (i.e. immediate

systems) significantly impacted individual outcomes. Like microsystems, macro-level factors have also contributed to individual outcomes.

Macro-environmental explanations. Macro-level explanations provide an opportunity to shift the focus from understanding people to understanding places that shape individual behaviors and outcomes (Kubrin & Weitzer, 2003). Macro-level theories and explanations explore the impact of neighborhoods, community climate and cohesion, socio-economic conditions, and/or policies that directly and indirectly affect people. The examination of macro-level factors within a juvenile's environmental context focuses on the juvenile's perception of macro-level conditions, as well as the impact of larger social forces such as social conditions, policies, and controls (Bynum & Thompson, 2005). Throughout the literature, macro-level forces have been found to systematically explain differences in delinquency patterns and have been beneficial to modeling crime (Onifade et al., 2010; Kubrin & Stewart, 2006; Jensen, 2003; Anderson, 2002; Sampson, Morenoff, & Gannon-Rowley, 2002; Gottfredson; Levanthal & Brooks-Gunn, 2000; McNeil, & Gottfredson, 1991). Many of these explanations have been based on studies concerning social forces that weaken social controls across neighborhoods.

As in the Social Control Theory, weak social controls have not only been reflected in the examination of microsystems but also been found to be the result of larger macro-level phenomena. Social Disorganization Theory served to identify larger level phenomena, which shifted individual-level explanations of crime to macro-level explanations of crime reflected in the breakdown of larger structures (Jensen, 2003). Early theorists such as Shaw and McKay (1929/1949/1969) used the Social

Disorganization Theory to explain and identify patterns of offending as it related to the geographic location of urban neighborhoods. They examined the link between spatial differences, poverty, racial inequality, and transient communities to crime and concluded that even when new families move into certain communities, trends of delinquency continue due to the breakdown in larger macro-level structures (Shaw & McKay, 1969; Johnson & Fackler, 2010). This finding established the foundation that larger neighborhood context contributes significantly to models of delinquency.

Both Social Control and Social Disorganization theories provide the basis to suggest that trends of delinquency can be explained by both micro- and macro-level phenomena. Furthermore, these theories provide insight into the connection between neighborhood and delinquency. Consequently, this forthcoming study seeks to further investigate how these systems jointly contribute to recidivism. While most current models of recidivism (i.e. risk assessments) have failed to incorporate both micro- and macro-level components, there is the possibility of inaccurate measurements of juvenile recidivism. To that end, it is important that current models are sensitive to the extent to which micro and macro-level variables contribute to understanding juvenile crime given the evidence which suggests that these two forces impact one another (Johnson & Fackler, 2010). This next section examined how both micro- and macro-level systems enhance our ability to predict future crime.

Connections have been made between the socioeconomic ecology of neighborhoods and juvenile crime. Emphasis on community resources has been the focus of poverty and neighborhood research that dates back to the 1940's (Levanthal & Brooks-Gunn, 2000). By the 1970's and 1980's, an expansion of social disorganization

theories, provided additional models concerning the link between community resources and individual outcomes. This body of research emphasized a positive correlation between growing up in poor neighborhoods and increased delinquency (Levanthal & Brooks- Gunn, 2000). Specifically, factors such as the concentration of single-parent homes, housing stability, and ethnic heterogeneity of neighborhoods were found to have a negative impact on social order in the neighborhood (Levanthal & Brooks- Gunn, 2000). Sampson, Morenoff, and Gannon-Rowley (2002) conducted a meta-analysis of 40 studies and found that family status, neighborhood conflicts, poverty, racial segregation/isolation, family dynamics (i.e. concentration of single-parent homes), the concentration of home owners within a neighborhood, transient communities, neighborhood collectivity, social class, race, and increased poverty were linked to criminal activities (Sampson, Morenoff, & Gannon-Rowley, 2002). These variables significantly captured the socio-economic experiences of individuals within neighborhoods.

Additionally, Pratt & Cullen (2005) found, in a review of 214 studies (effect sizes = 1,984) that macro-level theories like deprivation and social disorganization theories were the most significant and stable predictors of long-term offending. More specifically, higher concentrations of disadvantageous factors observed at the neighborhood level were stable predictors in determining an individual's participation in the criminal justice system (Pratt & Cullen, 2005). On the other hand, some macro-level phenomenon inconsistently predicted recidivism (i.e. policing and strict policies to address crime) (Pratt & Cullen, 2005). Not only have these trends been captured systematically in

meta-analyses, but these macro-level connections to individual outcomes have also been identified in qualitative studies.

In a study which reviewed the narratives of drug dealers and users, participants identified macro-level risk factors which impacted their involvement in drug activity (Johnson & Fackler, 2010). Participants reported that the lack of social capital, the lack of societal opportunities, and increases in poverty within their neighborhood impacted their participation in drug activities (Johnson & Fackler, 2010). The results suggested that these macro-level conditions not only impacted their individual decisions but also negatively impacted micro-level structures, like the family and peers (Johnson & Fackler, 2010).

Moreover, trends regarding the impact of socioeconomic conditions on individuals have been mirrored in more recent studies. For example, Onifade et al. (2011) found that after examining socioeconomic trends as indicated by Census records, different types of neighborhoods have different rates of recidivism. Furthermore, they found that risk assessment instruments which predicted recidivism also performed better for certain neighborhood types, specifically distressed and well-established/wealthier communities but not for resilient communities where juveniles were exposed to both positive and negative factors that impact rates of recidivism (Onifade et al. 2011). Although juveniles within the resilient community exhibited some instability, these neighborhoods also reported high rates of protective factors (e.g. higher graduation rates) (Onifade et al., 2011). While research found that juveniles living in more distressed communities were also more likely to show higher rates of criminal activity (Onifade et al., 2011; Morenoff, Sampson, & Raudenbush, 2001; Anderson,

2002), these trends may not be consistent among juveniles who live in communities that do not fall on extreme ends of the spectrum (i.e. rich versus poor) (Onifade et al., 2011).

Additionally, given crime type varies by social areas, there is some question of whether crime is more prevalent in impoverished areas or if crime is being expressed differently based of environmental context and/or crime type. One meta-analysis which examined the relationship between violent, crime, and income equality across 34 aggregate studies found that economic inequality is significantly correlated to violent crimes (Hsieh & Pugh, 1993). In addition, homicide and assault were more closely associated with poverty (i.e. homicide and assault) and while rape and robbery were more apparent in less impoverished areas (Hsieh & Pugh, 1993). Likewise, Gottfredson, McNeil, and Gottfredson (1991) found that when examining self-report data of juvenile offenders across specific social areas, juveniles in less impoverished areas were likely to self-report involvement in certain types of crimes, such as robbery. Gottfredson, McNeil, Gottfredson (1991) also found that while specific social areas were more likely to be involved in certain types of crime, when it came to juveniles self-reporting criminal involvement, there was no significant difference across neighborhood types and the amount of crime reported. These findings highlight that individual experiences vary across neighborhood context and increased poverty contributes to more negative outcomes.

While resource deprivation seems to be a key indicator of crime it does not mean higher crime rates are more likely to occur across poor areas. Juvenile recidivism varies by neighborhood due to differences in culture, police response, community cohesion, and reporting. For this reason, incorporating factors such as the measures of the

juvenile's neighborhood context in risk assessment instruments provides an opportunity to adequately investigate models of recidivism.

Future inclusion of neighborhood factors in juvenile risk assessment instruments may serve as a means to better understand what risk assessments truly measure and predict. Currently, risk assessments focus more on individual and proximal factors, but, factors such as poverty, joblessness, neighborhood services, availability of social services, and housing dynamics may potentially enhances these assessments (Kubrin & Stewart, 2006). They also represent single-level approaches to model recidivism. Because juveniles' experiences are nested within a social and geographic context that impacts various social controls, these measures must be examined to understand the true nature of risk for recidivism (Onifade et. al, 2008). Although risk assessments are purportedly used to reduce bias, a measure of bias continues to exist across disadvantaged groups (e.g. ethnic minorities) (Onifade et al., 2008). Ideally, these instruments should be equitable across all groups regardless of neighborhood.

In summary, past research has confirmed that macro-level environmental factors are important in models of delinquency. The primary goal of the research reported here examined delinquency from this multilevel perspective to better determine how ecological systems (i.e. micro- and macro- systems) together determine and/or impact individual experiences as it relates to patterns of reoffending. For this reason, the Ecological Model seems to be promising framework for tying former research together.

Ecological Nature of Crime: A Conceptual Framework for Tying it All Together

The ecological perspective suggests that delinquency is the result of risk factors that exist within the individual and the social environment (Anderson, 2002). Juvenile

offenders are described as being nested within their school, family, and peer environments which influence their behaviors and development (Anderson, 2002). Bronfenbrenner (1986) proposed that micro- and macro-level factors are highly correlated with individual outcomes. As a result, delinquency has been explored through a contextual lens to further explain the etiology of delinquency. This perspective explores the impact of individual-level characteristics as well as the broader ecological systems of school, family, housing, transient communities, economy and labor force (Bronfenbrenner, 1986; Rosen & Turner, 1967). Ultimately, it is this perspective that seems to have the greatest potential to provide a more comprehensive understanding concerning the coexistence of various single-level explanations of crime.

Bronfenbrenner's (1977) ecological framework suggests that neighborhoods provide an understanding of the rich context concerning various social phenomena impacting juvenile development. This model delineates immediate/proximal factors as well as distal/macro-level factors which play a formal and/or informal in role in the development of youth. Consequently, this ensures the inclusion of environmental structures that may improve our understanding of social issues such as juvenile delinquency.

The Ecological Model is based on three assumptions: Individuals are influenced by their environment; Individuals are active agents who shape their environments through practices, activities, attitudes and perceptions; Change in one ecological system consequently leads to changes in other ecological systems (McWhirter et al., 2007). As a result, a change across the most distal system, the macro-system, has the potential to impact juveniles at the individual-level. As shown in the Ecological Model

located in Appendix A, the interconnectedness of ecological contexts makes it important to not focus on any one ecological level (i.e. individual-, micro-, or macro-) exclusively. One benefit of adopting an ecological framework is the opportunity to investigate multilevel phenomena using multilevel approaches and, providing an opportunity for context specific models (Luke, 2005).

Community psychologists are interested in ecological frameworks based on the multilevel theories used to explain various social phenomena and have relied on methodologies to analyze the various systems involved in impacting the development and well-being of individuals. Researchers draw on somewhat complex statistical models to explore the relationships between social issues, mental health phenomena and the overall development of individuals (Dalton, Elias, & Wandersman, 2007; Luke, 2005). Given community psychologists aim to examine how multiple ecological levels interact with one another and impact a particular social phenomenon, the Ecological Model provides a heuristic, or mental model fortifying together contemporary thinking concerning the etiology of delinquency.

The application of an ecological framework. One strategy for capturing the ecological context of juvenile offenders is to understand the role neighborhoods play in the development of youth. It is possible that neighborhoods have both indirect and direct influences on outcomes such as delinquency and recidivism; thereby influencing multiple systems that affect pathways of delinquency (Kroneman, Loeber, Hipwell, 2004). These systems are sometimes proximal in nature (i.e. friendships/family), having more direct effects on a juvenile's development, while other systems are more distal

(i.e. community climate) and may indirectly impact the development of youth (Kroneman, Loeber, Hipwell, 2004; Levanthal & Brooks-Gunn, 2000).

Understanding the multiple influences of neighborhoods provides an opportunity to better measure and model crime. As courts and other child welfare/social agencies are better able to model crime, the ability to predict future occurrences of criminal activity and guide effective interventions should improve (Wikstrom & Sampson, 2003). This potentially leads to reducing criminogenic risk in individuals and improving community settings that exhibit high intervention needs (Wikstrom & Sampson, 2003). The success of this strategy is contingent on adequately defining neighborhoods.

Neighborhoods can be defined by both geographical/physical spaces as well as the social conditions its residents experience. Throughout the years, many researchers have studied neighborhoods as a means to better capture the experiences and developmental processes of juveniles (Sampson, Morenoff, & Gannon-Rowley, 2002; Morenoff & Earls, 1999). While some researchers have defined neighborhoods based on the geographical/physical area in which people live, others have defined neighborhoods based on the collection of individuals and social networking processes occurring across groups (Sampson, Morenoff, & Gannon-Rowley, 2002). The availability of Census record data that illustrate block group and socio-economic provides an easily accessible measure or definition of neighborhood that many researchers have typically used (Onifade et al., 2010; Sampson, Morenoff, & Gannon-Rowley, 2002; Levanthal & Brooks-Gunn, 2000; Jencks & Mayer, 1990). Because of the variety of characteristics that have been associated with neighborhoods, and the strong relationship between neighborhood characteristics and many individual-level experiences, this study focused

on neighborhood as determined by geographic location. This research drew upon previous neighborhood research to better understand and model the ecological nature of crime.

Specifically, Jencks and Mayer's (1990) argued that there are five major explanations concerning how the ecological context of neighborhoods influences pathways of criminal activity. These models include:

1) Neighborhood Institutional Resource Model: Neighborhood experiences are influenced by resources. Some of these resources include community resources such as parks, churches, and community centers. Ultimately, these resources also influence other community activities related to crime (e.g. policing, surveillance, concentration of officers).

2) Collective Socialization Models: Neighborhoods involve social organizations, networks and groups. Some of these include role models, adult supervision, and specific routines and practices, and monitoring.

3) Contagion/Epidemic Models: A pessimistic view of neighborhoods focused on problematic behaviors that negatively influence peer groups, families, and community members.

4) Models of Competition: Individuals are forced to compete for limited resources within their neighborhoods.

5) Relative Deprivation Model: An individual's behavior is influenced by and reflective of his/her evaluation and/or perception of their neighborhood situation.

Collectively these models highlight the need for community resources including monitoring, positive peers, reduced competition, perception of resources as a

prevention or intervention mechanism for reducing crime as well as the function of an individual's role in crime (i.e. contagion/epidemic models). This multi-faceted framework is beneficial in attempting to understand the role and impact of neighborhood disadvantage, highlighting factors leading to weak social controls, which ultimately effect macro-level phenomena. The same patterns described in these five models are consistent with research concerning the micro and macro-level nature of criminal activity (Onifade et. al. 2011; Kroneman, Loeber, Hipwell, 2004; Levanthal & Brooks-Gunn, 2000; Wikstrom & Loeber, 2000). For this reason, the Developmental Ecological Model serves to connect the multilevel conceptual theories already adopted as well as explain and predict a perpetuator's crime and/or reoccurrence of crime.

Based on the previous research that consistently found neighborhood disadvantage to be one of several indicators and predictors of crime among both juvenile and adult populations, the ecological perspective serves to utilize this notion as a link between neighborhood, individual, and micro-level components of juvenile delinquency. For instance, Kubrin and Stewart (2006) found that socioeconomic characteristics and recidivism rates of adult offenders from economically disadvantaged neighborhoods accounted for 13% of the recidivism across neighborhoods (Kubrin & Stewart, 2006). Although individual characteristics (i.e. race, gender, age, criminal history etc.) collectively accounted for a larger proportion of recidivism than socioeconomic status, recidivism did vary across community resources and the attention to the community factors enhanced the measure of recidivism (Kubrin & Stewart, 2006). This study adopted the Ecological Model to not only expand our

understanding of juvenile delinquency, but highlight how delinquency varied across context.

To understand the role of neighborhoods and their connection to delinquency and recidivism, previous studies focused on neighborhood context characterized by socio-economic characteristics, which are strongly related to criminal activity and reflective of social phenomena that exist within the environment (Pratt & Cullen, 2005; Wikstrom & Loeber, 2000; Gottfredson, McNeil, Gottfredson, 1991). For instance, socio-economic disparities often identified in neighborhoods where there was an increased number of minorities have been explained by social inequalities relating to racial discrimination (Gottfredson, McNeil, Gottfredson, 1991; Wikstrom & Loeber, 2000; Onifade, Petersen, Davidson, & Bynum, 2010). The interaction of race and class underlie most of these observations. Additionally, these same variables often exhibited positive relationships with other phenomena such as community resources, which served as protective factors for future delinquency (Levanthal and Brooks-Gunn, 2000 & Jencks & Mayer, 1990). As a result, the ability of Census data to capture the socioeconomic conditions of neighborhoods seems promising given this metric is used for the allocation of resources concerning issues of delinquency and was adopted in the current study.

Summary of Literature and Current Gaps

Risk assessments have largely focused on capturing individual- and micro-level criminogenic risk factors (Onifade, Davidson, & Campbell, 2009). By focusing on person -centered risk factors such as family circumstances, delinquent peers, leisure activities, school/education needs, criminal history, personality, behaviors, attitudes, and

orientation, practitioners are able to better model delinquency and appropriately respond to the needs of juvenile offenders (Onifade et al. 2008; Schwalbe, Frazer, & Arnold, 2004; Demo & Schmeidler, 2003; Cottle, Lee, & Heilburn 2001; Schumacher & Kurz, 2000; Gorman-Smith et al., 1996; Andrews, Bonita, & Hoge, 1990). However, one issue with these instruments is that they are not equally valid when it comes to predicting outcomes for varying demographic groups. As such, these models predict differentially for various subgroups (Onifade et al., 2011, Loeber, & Hipwell, 2004; Onifade, Petersen, Davidson, & Bynum, 2010). For this reason, the current study examined the interaction of neighborhood context and criminogenic risk.

Given that risk assessment tools appear to exacerbate the assigned risk of certain subgroups (i.e. minority girls, poor/urban areas, and resilient juveniles) and still account for a limited proportion of delinquency, it is imperative to examine whether delinquency is influenced by larger macro-level phenomena (i.e. neighborhoods) (Onifade, Davidson, Campbell, 2009 ; Onifade et al., 2011). While previous research found that certain characteristics independently capture recidivism (i.e. personality, race, behaviors, gender etc.) the extent to which the environment matters once these predictors are controlled has yet to be explored. Being able to truly partial out these independent characteristics in a multilevel model provides an opportunity to study the degree to which neighborhood really matters (Onifade, Davidson, Campbell, 2009; Onifade et al., 2008; Schwalbe et al., 2006). For this reason, the goal of this research was to apply a multilevel lens to our understanding of delinquency and recidivism and further observe how the phenomena of delinquency functions over time.

Need to integrate theories. Levanthal and Brooks-Gunn (2000) proposed that to adequately address community/neighborhoods when understanding delinquency, it is essential to control for individual-level factors and incorporate key microsystems like family, school, peers etc. Similarly, Wikstrom and Sampson (2003) suggested models of crime are biased if they fail to include interactions that are occurring across individuals, microsystems, and macrosystems. When models lack the inclusion of specific levels of behavior, it becomes too difficult to examine the causal pathways that exist due to the absence of key components which influence criminal activity (Wikstrom& Sampson, 2003). The absence of key components introduces what statisticians refer to as “omitted variable bias”. As a result of this omission, 'bias' is created when (1) the missing variable (factor) is correlated with other known independent variables and (2) the model compensates for the missing factor is by over- or under-estimating one of the other factors. For this reason, attention must be given to individual-level, micro-level, and macro-level explanations of crime. They enhance the interpretation of causal models and serve to help further understand whether environments impact neighborhoods or if neighborhoods are a function of the environment (Elliot, 1979). Since there are multilevel theories concerning the etiology of a specific phenomenon it is essential that multilevel methodological approaches are used in understanding, measuring, and analyzing such phenomena (Luke, 2005).

Given that most theories focused on only a single-level of behavior, the interconnectedness of the ecological context of juvenile offenders reveals the importance of a multilevel framework when understanding and measuring delinquency and recidivism (Wikstrom & Sampson, 2000; Elliott et al., 1979). Elliot et al.’s (1979)

original work attempted to address this issue by focusing on patterns of delinquency. They incorporated micro- (social bonding) and individual-level (social learning) theories together to represent the ecological nature of crime. That juveniles embody specific characteristics and responses based on environments and also potentially shape environmental phenomena, there needs to be multilevel application to better understand the etiology of delinquency. This study addressed the need for multilevel longitudinal research applications to understand the role context plays in the risk for recidivism, with the adoption of an ecological theoretical framework which conceptually identifies key structures and systems which impact the phenomena of delinquency.

Need for longitudinal research. After adopting an ecological model/perspective within the setting of the juvenile justice system, it is important to explore the long -term nature of crime Juvenile court systems have used risk assessment instruments to identify criminogenic risk (factors which predict future crime). These criminogenic risk factors that are both static and dynamic include the evaluation of factors like criminal history, education, leisure activities, peer relationships, substance abuse, family circumstances, criminal attitudes, and personality/behavior (Andrews, Bonita, & Hoge, 1990). These characteristics have been used to model/measure the probability a juvenile will reoffend/recidivate have often been observed at one the initial time/entry point a juvenile comes in contact with the court. Hence, these studies do not focus on the trajectory of crime among juvenile offenders. While it is the case that various distal- and community -level factors have been used to explain and measure crime rates, to better understand if such factors are trends or aberrations it is important to observe these factors over time, especially since environments change over time (Levanthal &

Brooks- Gunn, 2000; Sampson, 1986; Bynum Thompson, 2005; Sampson, Morenoff, & Earls, 2009; Shoemaker, 2010).

Longitudinal research is needed to determine whether distal factors, such as neighborhood characteristics/context, moderate the relationship between risk and recidivism over time. Pratt and Cullen (2000) suggested that specific theories do not hold up over time (i.e. social controls) and show little evidence of being able to predict long-term analogous behaviors. While different controls (micro versus macro) potentially have different effects over time, an ecological framework is necessary to capture how all systems jointly impact long-term offending. However, it has also been suggested that most studies are not longitudinal in nature because of cost, resources, and difficulty in capturing and tracking long-term offending patterns. Given the complexities of collecting and observing such data, longitudinal research has been lacking (Onifade, et, al, 2010; Wikstrom & Sampson, 2003; Gottfredson, McNeil, Gottfredson, 1991). Understanding how context moderates the relationship of risk over time, trends and patterns of specific groups across neighborhoods should provide for a more comprehensive understanding concerning the construction of juvenile recidivism and the factors and forces which promote and/or contribute to a juvenile's ability to survive without future court contact.

Chapter 3: Current Study

Current Study Rationale

To understand the person-environment interaction and its impact on patterns of delinquency, several theories need to be integrated (Gottfredson, McNeil, & Gottfredson, 1991; Elliot, 1979; & Barker, 1968). This integration provides more accurate predictions of future recidivism, as well as highlights how both individual characteristics and neighborhood conditions impact delinquency trends over time (Gottfredson, McNeil, & Gottfredson, 1991). By accounting for individual characteristics, researchers can accurately examine the role of neighborhoods; this is useful in sorting out if environments potentially increase risk or if certain individual-level characteristics drive risk rates of recidivism independent of context (Wikstrom & Loeber, 2000; Gottfredson, McNeil, & Gottfredson, 1991).

Most studies are cross-sectional in design and single-level in nature (Wikstrom & Loeber, 2000; Gottfredson, McNeil, & Gottfredson, 1991). This study examined long -term delinquency, accounting for the multilevel nature of recidivism. This study also attempted to capture the ecological levels of delinquency by accounting for demographic characteristics of juveniles as well as their neighborhood context. Furthermore, this study explored how time to recidivism varied across context after controlling for individual characteristics (race, gender, and criminogenic risk level) that have been determined as single -level indicators of criminal offending using the *Youth Level of Service/Case Management Inventory (YLS/CMI)*.

Risk assessments, like the *YLS/CMI*, reflect the ability to use measurements as a means to predict future occurrences of criminal activity. These tools focus on more

objective individual-level/proximal risk factors exhibited by the offender thus replacing the reliance on professional judgments. . These tools typically provide a description of offenders and an estimate concerning the probability the offender will commit future crime (Andrews, Bonita, & Wormith, 2006). Ultimately, such instruments are used to provide courts with useful information to determine which cases should be maintained under court supervision and which cases would be most successful when dismissed (Andrews, Bonita, Wormith, 2006). Given their promising effects, courts have expanded the use of these models of recidivism to better serve the needs of the court and offender, as well as to better capture the pathways of delinquency. The use of these individual/proximal measurements have a long history within the justice system and are promising tools that highlight and capture both individual-level characteristics and information concerning the microsystems/micro-environments (i.e. family, school, peers etc.) that may influence juvenile offenders (Onifade, et al., 2011; Andrews, Bonita, Wormith, 2006; Cottle, Lee, Heilburn, 2001).

Cottle, Lee, and Heilburn (2001) suggested that the *YLS/CMI* was one of the most used and validated long-term juvenile risk assessments for males and females. Adapted from an adult risk assessment instrument originally developed in Canada to determine risk factors and predict reoffending (Flores, Travis & Latessa 2004), the instrument was based on meta-analytic studies which examined characteristics of re-offending in adult populations (Flores, Travis & Latessa 2004). Following the construction of the adult assessment known as the *Level of Service Inventory-Revised (LSI-R)*, long-term follow-ups suggested that the measure had utility and was successful at predicting recidivism (Flores, Travis & Latessa 2004). Additionally, the measure also

predicted outcomes that focused on individual-level and proximal criminogenic risk factors to help determine whether an adult received residential placement versus incarceration (Andrews & Bonita, 2006). Based on the evidence of validity among adult populations, the measure was adapted to juvenile populations. The modification of the *Level of Service Inventory- Revised (LSI-R) for* juvenile offenders led to the 42 item Youth Level of Service/Case Management Inventory *YLS/ CMI* (Flores, Travis & Latessa 2004).

This current study used data collected using the current version of the *YLS/CMI*. Through assessment it has been deemed the most successful for identifying the individual-level and proximal pathways of delinquency (Cottle, Lee, & Heilburn, 2001). However, this measurement is not without fault. Researchers have established that the instrument classifies only 40% of specific juvenile offending populations and that validity of assessment varies across neighborhood context (Onifade, et al., 2011 & Onifade, et al., 2010). This study investigated how neighborhood context moderates the relationship between risk and time to future recidivism. Given risk assessments only account for a small percentage of crime and environments have been found to matter independently, this study explored how environments may contribute to a more comprehensive explanation concerning the trajectory of delinquency.

Research Questions and Hypotheses

This study answered the following four questions:

1. What is the effect of neighborhood type on recidivism?
2. What is the effect of neighborhood type on recidivism when individual-level factors such as race, gender, and risk group are controlled?
3. Is there a moderating effect of neighborhood type on the relationship between gender and recidivism?
4. What is the moderating effect of neighborhood type on risk and recidivism?

Question 1

1. What is the effect of neighborhood type on recidivism?

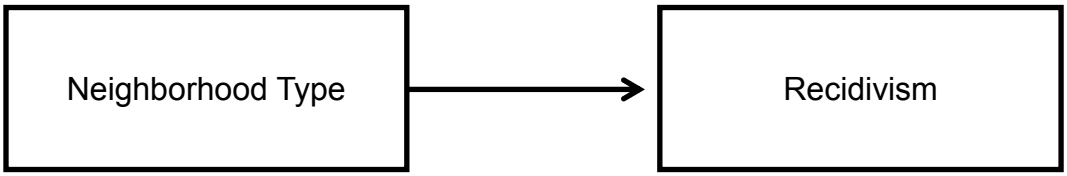

Figure 1. Proposed main effect of neigborhood type (i.e. Distressed, Benchmark, and Resilient) on recidivism.

Null Hypothesis 1. There are no differences across neighborhood type.

It was expected that neighborhood type would significantly affect recidivism. This means that Distressed, Benchmark, and Resilient neighborhood types would account for the effect of neighborhood.

Question 2

2. What is the effect of neighborhood type on recidivism when controlling for race, gender, and risk group?

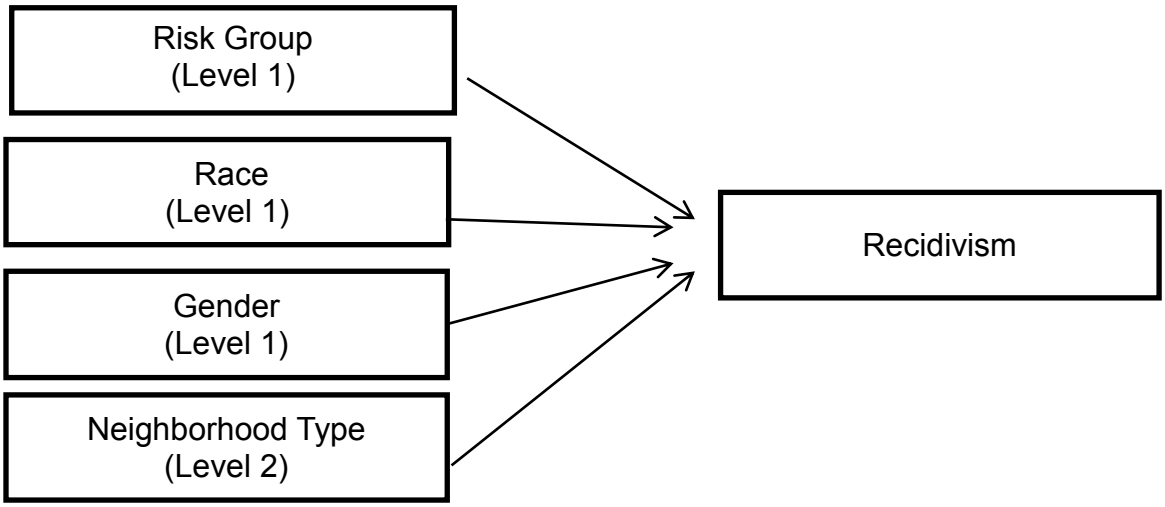

Figure 2. Proposed main effect of neighborhood type and juvenile crime when controlling for risk group, race, and gender.

Null Hypothesis 2. There are no differences in recidivism across neighborhood type after controlling for Level-1 predictors (i.e. risk group, race, and gender).

These Level-1 factors reflect a juvenile's individual-level (i.e. personality, attitudes, and behaviors etc.) and micro-level (i.e. peers, family, and education etc.) risk for recidivism. The purpose of this question is to understand whether neighborhood type significantly effects recidivism over and beyond individual-level and micro-level risk factors. It was expected that neighborhood type would significantly affect recidivism even after controlling for risk group, race, and gender. More specifically, it was expected that the Distressed neighborhood type would have a significant effect on recidivism.

Question 3

3. Is there a moderating effect of neighborhood type on the relationship between gender and recidivism?

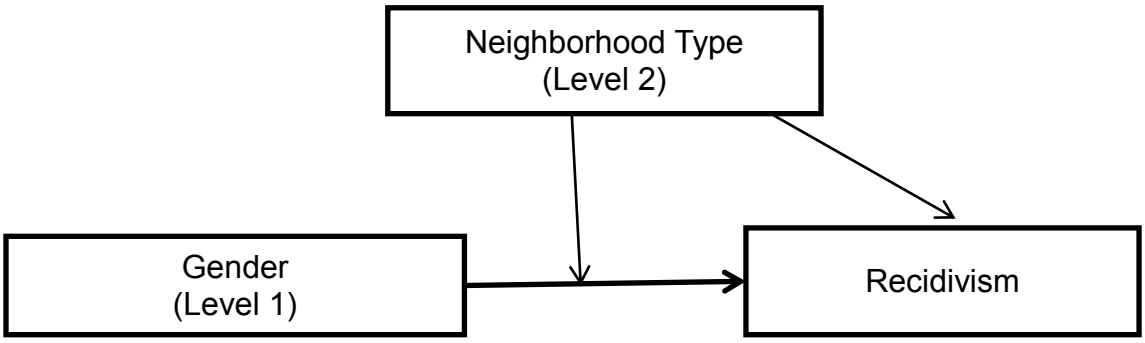

Figure 3. Proposed main effect of gender and recidivism when moderated by neighborhood type.

Null Hypothesis 3. There is no interaction between neighborhood type and gender.

This question captured the potential interaction between gender and neighborhood type before running the complete model (Question 4). If neighborhood moderated the relationship between gender and recidivism, this interaction would be included in the final model (Question 4). It was expected that neighborhood moderates the relationship between gender and recidivism.

Question 4

4. What is the moderating effect of neighborhood type on risk and recidivism?

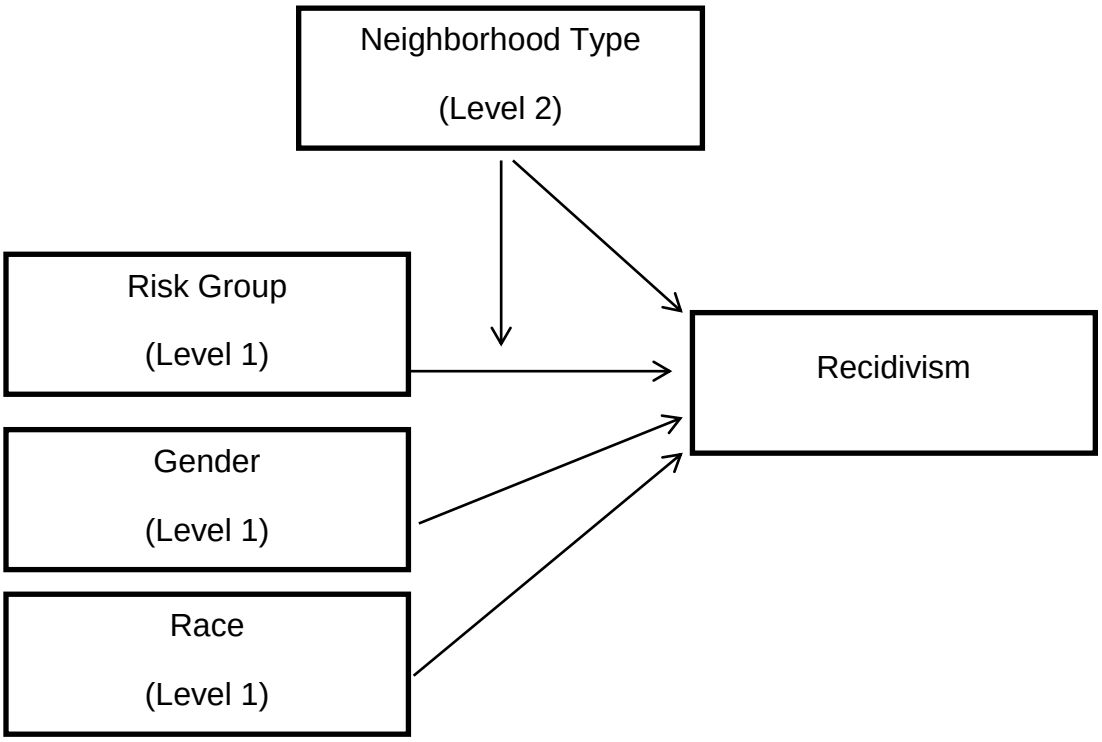

Figure 4. Moderating effect of neighborhood type on risk group and after controlling for gender and race.

Null Hypothesis 4. Neighborhood type does not moderate the relationship of risk group and recidivism.

Figure 4 represents how risk group potentially varies as a function of neighborhood type. This question determined the extent to which neighborhood type moderates the effect of risk group recidivism to understand the role neighborhood plays in recidivism. It was expected that neighborhood type moderates the relationship of risk group and recidivism even after controlling for gender and race.

Nature of Study

Conceptually, a multilevel approach incorporates individual-, micro-, and macro-level characteristics which explain future criminal activity. Statistically, this multilevel representation was explained using two levels. Level-1 represented both the individual- (i.e. gender, race, and risk factors which examine personality, attitudes etc.) and micro-level characteristics (i.e. risk factors which examine peer relationships, family, education, etc.) of juveniles. This level served to explain distinct and unique characteristics of each juvenile offender examined in the juvenile probation population of interest. Level-2 captured the context in which these juvenile offenders lived. This macro-level context is defined by the socio-economic conditions within the juvenile's neighborhood as determine by Census data. This level represents the social conditions experienced within a juvenile's neighborhood.

It is also important to point out that this study was unique in that the re-occurrence of delinquency was the dependent variable rather than initial occurrence, which is the more common approach in the literature. As such, this study examined whether variables which have been used to understand the onset of delinquency were also applicable to recidivism among a group of known offenders.

This exploratory study was based on archival data that employed one of the most widely used juvenile risk assessments known as the *Youth Level of Service/Case Management Inventory (YLS/CMI*) to define/determine a juvenile's criminogenic risk. To understand the main effect of neighborhood and the role neighborhood plays on the relationship between risk and recidivism, this study was divided into two sub studies. The first study addressed the first two questions: What is the effect of neighborhood

type on recidivism? What is the effect of neighborhood type on recidivism when individual-level factors such as race, gender, and risk group are controlled)? The second study answered Questions 3 and 4: Is there a moderating effect of neighborhood type on the relationship between gender and recidivism? What is the moderating effect of neighborhood type on risk and recidivism?).

Dividing the study into two parts was necessary because of the nature of each research question. Questions 1 and 2 allowed all juveniles to be evaluated; the purpose was to understand the overall effect of neighborhood on recidivism. Given that there was at least one juvenile across each of the three neighborhood types evaluated and all blocks were assigned a neighborhood type, all juveniles (N = 893) and block groups (N = 161) were included in this first set of analysis. However, data were reduced to answer Questions 3 and 4.

Questions 3 and 4 explored the moderating effect of neighborhood on risk and recidivism. In particular, Question 3 was an exploratory/pre-analysis question to examine the moderating effect of neighborhood type on gender and recidivism. If an interaction was observed and statistically significant, this interaction would be included in the full and final model (Question 4). To examine Question 4, whether neighborhood moderated the relationship between risk and recidivism, there had to be at least one youth from each of the four risk groups (Low, Environmental Needs/Moderate, Family Needs/Moderate, and High Risk). Again, this means that only the block groups that had at least four juveniles and at least one juvenile from each risk groups. This decision was made because the multilevel survival analyses required at least one case be observed as a means to estimate the parameters for that specific group. Eliminating those block

groups that did not have at least one youth per risk group within each block group/neighborhood, study two involved a reduced sample size of 470 juveniles and 45 block groups/neighborhoods. More details of this study are further provided in the Methods section.

Chapter 4: Methods

Setting

This study is a smaller exploratory study within a greater research project, known as the Juvenile Risk Assessment Project. This tax-funded court-mandated project, which started in 2003, took place in a mid-western county located in the state of Michigan. The overall goal of the research project was to assess risk and intervention needs for juveniles and their families. Data provided for this project was determined by the court system's protocols and policies. The depth and the format of the data were determined by the court.

Data Source

This study was based on anonymous secondary/archival data. No name and address identifiers were available in the data system. The final database used for this study included three data sets which involved 1) the Youth Level of Service/ Case Management Inventory (*YLS/CMI*) risk assessment data, 2) recidivism data, and 3) U.S. Census records from 2000. Risk assessment and recidivism data were collected from 2004-2010.

Court personnel collected these data for every juvenile who came in contact with the court system due to a referral or petition as result of some alleged criminal activity within this four year period. These sources provided information regarding the juvenile's risk, recidivism, and neighborhood at the time of their initial criminal offense.

Procedures

Risk Assessment Data Collection

Risk assessment was based on a score given to every offender who came in contact with the juvenile court system from 2004 to 2010 with respect to their risk for recidivism. Trained court personnel administered the *Youth Level of Service/Case Management Inventory* (YLS/CMI). This risk assessment scores ranged from 0 to 42. Each juvenile was classified based on predetermined risk levels determined by the original assessment developers (Hoge & Andrews, 1990). Low risk juveniles ranged from 0 to 8, moderate risk juveniles ranged from 9 to 22 and high risk juveniles ranged from 23 to 34 and very high risk juveniles ranged from 35 to 42 (Hoge & Andrews, 1990). More information concerning the risk assessment can be found in the Measurement section.

Recidivism Data Collection

For this study follow-up recidivism records were retrieved for all juvenile offenders who came in contact with the court after his/her initial crime. Recidivism was observed for different increments of time for each juvenile offender since each juvenile entered and exited the court at different time points between 2004 -2010. Observation of recidivism ranged from 4 years to 3 months. For cohorts of juveniles who entered into the court from 2004-2006, up to four years of recidivism was observed. For juveniles who entered in 2007, up to three years of recidivism was observed. Juveniles who entered in 2008, two years of data was observed compared to one year or less for those who entered from 2009-2010.

Once juveniles reach the age of majority (age 18) juvenile recidivism data were no longer collected. Records for these individuals were obtained to consider potential recidivism that occurred at the adult level. In this study all individuals over the age of 17 are considered adults. Data were right censored and the selected analysis remained sensitive to the time differences observed for each juvenile and censorship.

Census Data Collection

Additionally, Census data were utilized to examine neighborhood information based on where each juvenile offender lived at the time of his or her initial crime. The Census neighborhood data used for this study was based on a prior study (Onifade, et al., 2011), which obtained block group information to determine the socio-economic ecology of each juvenile's neighborhood. This data set provided valuable information concerning the macro-level socioeconomic experiences of the juvenile's neighborhoods at the time of the crime and is further described in the Measurement section (see Neighborhood Type).

Participants

All court data analyzed for this study came from the Delinquency/Formal Probation Division. This court division serves juveniles who come in contact with the court due to a formal court petition based on some report of either a general offense and/or a status offense (engagement in activities that are permitted for those of legal age). This court division serves repeat offenders, first time juvenile offenders arrested by the police, and first time offenders who were referred by Intake/Informal Probation Division due to moderate or high risk scores determined by the *Youth Level of Service/Case Management Inventory (YLS/CMI).* At this level of the judicial court

process, juveniles must appear before a judge to receive an adjudication, which may include dismissal, community-based interventions (e.g. diversion), and/or other dispositions (e.g. residential programming, intensive probation).

Table 1 presents the overall demographics for participants in this study. Participants (N = 893) in this study included males (666) and females (227) ranging from ages 10-18 (mean age = 14.77, *SD* = 1.48) who came in contact with the Juvenile Court System over a 7-year period from 2004-2010. For purposes of this study race and ethnicity variables were combined into a dichotomous variable of White (355) and Non-White (358). Juveniles classified as Non-White included Latinos (9%), African American/Blacks (35%), Multiracial (14%), and other (2 %). All juveniles were further classified based on likelihood of recidivism. Juveniles were categorized as being low risk (n= 186), moderate risk (n = 537), or high risk (n = 170) for reoffending as determined by *the Youth Level of Service/Case Management Inventory (YLS/CMI)* risk assessment instrument (Hoge & Andrews, 1990). Additional sample statistics concerning proportion of recidivism for each year is provided in Appendix D.

Table 1

Sample Descriptive of Juvenile Probationers (N=893)

Variables	Number	Valid Percentage
Gender	Male= 666	74.60%
	Female= 227	25.40%
Race/Ethnicity	White = 355	39.80%
	Non-White=538	60.20%
Age*	Range = 10-18	
	Mean=14.77	
	SD= 1.48	
Risk Level	Low Risk= 186	20.80%
	Moderate Risk= 537	60.10%
	High Risk= 170	19.00%

Note (*) Age reflects the age of juvenile when he/she initially entered the juvenile court system/formal probation division.

Given these data were archival and based on a population of youth who came in contact with the court during a specific time period, increasing the sample size was unlikely. Taking into consideration this research is a new development concerning the moderating role of neighborhood effects; the current study is exploratory in nature and serves as a preliminary investigation concerning understanding delinquency using a multilevel lens.

Furthermore, prior research on juvenile recidivism indicates that power analysis within this research area is limited and that more research is needed regarding applying power analysis to capturing the most appropriate sample size for these multilevel Cox Proportional Hazard Models (Wienke, 2011). After an exhaustive search, no power analysis was completed for the study. However, the current exploratory study enhanced our understanding of the potential for this type of multilevel research.

Chapter 5: Measurements

The purpose of this section is to provide a description and rationale concerning the use of each study measure. The following measures were used for the current study: a risk assessment instrument, known as the Youth Level of Service/Case Management Inventory (YLS/CMI) (Hoge & Andrews 1990); neighborhood typology (Onifade et al., 2011); gender; race; recidivism/time to recidivism.

Measure I: Risk Assessment Measurement (Independent Variable)

Description. The *Youth Level of Service/Case Management Inventory (YLS/CMI)* was used to examine proximal risk for recidivism for juveniles in this study (Hoge & Andrews, 1990). The 42-item *YLS/CMI* has been among the most trusted risk assessment instruments used within the juvenile court system (Schmidt, Hoge,; Gomes, 2005; Hoge & Andrews, 1990). This is because it is one of the few measures that show evidence of long-term reliability and validity (Flores, Travis, & Latessa, 2004). It is also one of the few risk assessment instruments that has generated a great deal of attention across juvenile courts due to its multiple uses (Flores, Travis & Latessa, 2004). This measure classifies juveniles by risk, predicts likelihood of future offense, and guides recommendations concerning juvenile offender outcomes (Flores, Travis & Latessa, 2004). Although this instrument has moved juvenile courts in the direction of “best practices” using an “objective”/systematic instrument to determine outcomes and dispositions of offenders, these instruments still only account for a limited proportion of juvenile delinquency (Onifade, Davidson, Livsey, Turke, Horton, Malinowski, Atkinson, & Turner, 2008).

The *Youth Level of Service/Case Management Inventory (YLS/CMI)* identifies eight domains that involve a series of items that identify a juvenile's likelihood of future offending (Hoge & Andrews, 1990). The eight domains include: (1) Prior/Current Offense History, 5-items; (2) Education/Employment, 6-items; (3) Leisure & Recreation, 3-items; (4) Peer Relations, 4-items; (5) Substance Abuse, 5-items; (6) Family & Parenting, 6-items; (7) Attitudes & Orientation, 5-items; and (8) Personality and Behavior,7-items (Hoge & Andrews 1990). More information concerning instrument domains and items are found in Appendix B.

Risk Level. In addition to understanding risk areas for each offender, the *Youth Level of Service/Case Management Inventory (YLS/CMI)* also determined overall level of risk. This assessment classifies juveniles across low (0-8), moderate (9-22), high (23-34), and very high (35-42) risk levels (Hoge & Andrews, 1990) as describe previously. Each of these risk levels represents the probability a juvenile will recidivate (Hoge & Andrews, 1990).

Risk Group (Cluster Type). In addition to using the low, moderate, and high risk group levels to describe overall sample characteristics and overall probability of reoffending, Onifade et al. (2008) proposed an alternative option to examine risk level using cluster typologies. Onifade et al. (2008) found that calculating overall risk level based on a juvenile's pattern of risks was more accurate in predicting future crime. After conducting a cluster analysis, these researchers found that there were different types of low, moderate, and high-risk offenders and that these types are the best way to describe a juvenile's risk level (Onifade et al., 2008). Onifade et al., (2008) also found that these risk groups/cluster types, predicted recidivism better than the original risk

levels predetermined by the originators of the *Youth Level of Service/Case Management Inventory/Case Management Inventory*. In addition, these clusters produced different rates of recidivism (Onifade et al., 2008).In the tradition of Onifade et al.'s (2008), we adopted the same scheme to measure risk level of juvenile offenders. Instead of the using the original low, moderate, and high risk levels, this study used cluster group to represent the risk level/risk group of each juvenile offender.

As shown in Table 2, the cluster analysis determined that there were 5 unique risk groups that came in contact with the juvenile justice system (Onifade et al, 2008). The first group was low risk; these juveniles were deemed low risk across all 8 risk assessment domains (Onifade et al., 2008). The second group was moderate risk with environmental needs; these juveniles lacked constructive free time (Onifade et al., 2008). The third group was also a moderate risk group with family needs; these juveniles flagged high on issues like family circumstances (Onifade et al., 2008). The final two groups were considered high risk (Onifade et al., 2008). These two groups had the same rate of recidivism; the only difference between the two groups was that one group was high risk with an offense history and other group was high risk with no offending history (Onifade et al., 2008).

One of the most important contributions from the Onifade et al. (2008) research was that of the five risk groups, there were two moderate risk cluster groups that not only flagged high risk on the opposite domains (as shown on Table 2) but these juveniles also had different rates of recidivism (Onifade, et al., 2008). After year one, one moderate risk group came in contact with the court 20% (Environmental Needs) of the time while the other group came into contact 28% (Family Needs) of the time. Given

that these cluster types were found to be more valid for predicting juvenile offenders, this study utilized the moderate risk solution to appropriately examine trends of recidivism across juveniles classified as moderate risk. Furthermore, this group was combined with the other high risk group because of treatment implications and risk trends. The four risk levels/risk groups for this current study included: (1) Negligible Risk (low risk), (2) Family Needs (moderate risk), (3) Environmental Needs (moderate risk), and (4) High Risk with/without criminal history (high risk). See Table 2 for more details.

Table 2

Description Youth Level of Service/Case Management Inventory (YLS/CMI) Risk Groups

	Negligible Risk (Low Risk)	Environmental Risk (Moderate Risk)	Family Needs (Moderate Risk)	*High Risk with Offense (High Risk)	*High Risk First Offense (High Risk)
YLS/CMI Domains				High Risk	
Offense	Low Risk	High Risk		High Risk	High Risk
Leisure	Low Risk	High Risk		High Risk	High Risk
Education	Low Risk		High Risk	High Risk	High Risk
Peer	Low Risk	High Risk		High Risk	High Risk
Substance Abuse	Low Risk	High Risk		High Risk	High Risk
Family	Low Risk		High Risk	High Risk	High Risk
Attitudes	Low Risk		High Risk	High Risk	High Risk
Personality	Low Risk		High Risk	High Risk	High Risk

Note (*): For this study, both High Risk Cluster Types were combined. No distinction is made across these two high risk groups as it relates to processing, disposition, and programming.

Administration. As previously mentioned, the *Youth Level of Service/Case Management Inventory YLS/CMI* is an interview which is given to every juvenile offender who has received a formal court petition document based on a complaint against a juvenile due to alleged involvement in a criminal activity. These interviews are administered by court personnel known as Juvenile Court Officers (JCO). Each JCO received training concerning interviewing and scoring interview forms across each of the eight risk domains (Prior and Current Offenses/Disposition; Education; Leisure and Recreation; Peer Relationships; Substance Abuse; Family and Parenting; Attitudes and Orientation; and Personality and Behavior). These domains, known as criminogenic risk factors identify key characteristics, which predict future crime. Inter-rater reliability checks were completed across a random 10% of juvenile cases to measure level of agreement of JCOs across full *YLS/CMI* interview items and domains. Results from inter-rater checks indicated that there was a 90% agreement across all items. Reliability checks were completed at 6 month intervals among all court staff involved in data collection. Once assessments were completed, computations were completed that determined which risk group (i.e. risk cluster type) each juvenile offender belonged to. Again, this cluster type/risk level determined the juvenile's risk group. Following administration of risk assessment interviews, all data were stored securely, archived for later use in court reports and in court hearings to inform JCO and judge decision-making concerning a juvenile's risk level and intervention needs.

Rationale for variable(s). The *Youth Level of Service/Case Management Inventory (YLS/CMI)* measures key criminogenic risk factors said to adequately identify and predict juveniles who are at risk for recidivism (Hoge & Andrews, 1990). These

items identify both individual-level characteristics like personality and behavior as well as proximal level factors like family and peer networks. These eight domains are said to be the best measurement for determining which juveniles are more likely to come in contact with the juvenile justice system (Onifade et. al, 2008; Schmidt, F., Hoge, R. D., & Gomes, 2005; Hoge & Andrews, 1990). What is still unknown is whether juvenile crime differs across neighborhood context when controlling for risk group. If these eight criminogenic risk factors are indeed the best predictor of time to recidivism, juveniles from the same risk group should have similar average juvenile crime (as measured by days to offense) regardless of neighborhood context, race, or gender. This neighborhood variable determined if time to offense differs for juveniles from specific groups (e.g. Distressed versus Benchmark Communities or White vs. Non-White) after controlling for criminogenic risk group.

Measure II: Neighborhood Type (Independent Variable)

Description. Neighborhood type data were based on US 2000 Census block group data. This Census block group associated with each juvenile is determined based on where the juvenile lived at the time of the crime. Instead of examining Census block group data individually, this study aims to focus on the neighborhood patterns/typology of each block group as a means to characterize not only where the youth lived but also the type of neighborhood each juvenile lived in. As a result, 161 block groups were examined within the county of interest and were further classified into 3 neighborhood types thereby specifying the socioeconomic ecological context juveniles lived in at the time of his/her offense.

Understanding patterns of risk by incorporating socio-economic variables are beneficial to gaining a more comprehensive description regarding the context in which juvenile offenders live. Neighborhood typologies are determined based on clustering Census neighborhood and demographic data, particularly those characteristics often associated with crime. Census block level socio-economic variables were analyzed using factor analysis which revealed that Census variables fell into three distinct factors labeled as Education Disadvantage, Labor Capitol, and Household Instability. These three factors were based on the following variables:

a) Single Parent Household- The percentage of households headed by a single parent of children under 18 within a given block group
b) Non-White- The percentage of residents that identified as Non-White
c) Educational Attainment- The number of residents who are 25 and or older who have graduated from high school and have received a high school diploma or higher degree
d) Residents Not Participating in Labor Force- The percentage of non-institutionalized citizens (>16) who are not participating in the labor force
e) Receiving Public Assistance- The percentage of households that have at least one resident that received public assistance (Temporary Assistance for Needy Families/ TANF) in the last year (12 months)
f) Income to Poverty Ratio- The ratio of family or unrelated individual income compared to their appropriate poverty threshold. Ratios reported below 1.00 indicate that the income for a given family is below the official definition of poverty, while a ratio of 1.00 or greater indicates income

above the poverty level. For example, if a family's income is reported to be 125 percent above the appropriate poverty threshold would have a ratio of 1.25

g) Households with More than One Person per Room- The percentage of households with more than one person per room. This number is determined by dividing the number of occupants by the number of rooms in the household

h) Rent Mortgage- The percentage of households spending more than 30% of their income on housing

Once these 3 factors were established, 161 block groups were clustered across all three factors to identify the different "types" of neighborhoods in which the juveniles lived. These three neighborhood types included: (1)"Benchmark" neighborhoods which had high rates of employment and income, (2)"Distressed" neighborhoods which were impoverished communities with low outcomes across all socio-economic indicators, and (3)"Resilient" neighborhood which were communities that have a balance of both positive and negative characteristics (e.g. very transient but high graduation rates). The Benchmark, Distressed, and Resilient were then used to characterize the block group juveniles lived in at the time of their initial crime. Because Benchmark communities had high outcomes/protective factors overall, this group was used as the reference group in a forthcoming study. As a result, both Distressed and Resilient neighborhood types were compared to the Benchmark neighborhoods. Additional information concerning neighborhood type descriptive statistics can be found in Appendices F.

Rationale for variable(s). This approach to characterizing neighborhoods is useful because research often dichotomizes neighborhoods into urban/rural, urban/suburban, or rich/poor. However, these typologies take into account neighborhoods have a variety (Onifade, et al., 2011). This neighborhood typology, especially with the inclusion of a "resilient" neighborhood is also important because it accounts for the experiences of juveniles who did not come from neighborhoods that are often polarized more on one extreme (i.e. very poor or wealthy). This is also especially important given that risk assessment predictions are less accurate for "Resilient" neighborhoods, where many high risk scores do not necessarily infer likelihood for recidivism as within other neighborhood typologies (i.e. Benchmark and Distressed) (Onifade et al., 2010). These pre-established neighborhood types were utilized for this current study are further described in Figure 5, which highlights how Benchmark, Resilient, and Distressed peaked across the three neighborhood factors generated from the factor analysis (i.e. Education Disadvantage, Labor Capital, and Household Instability).

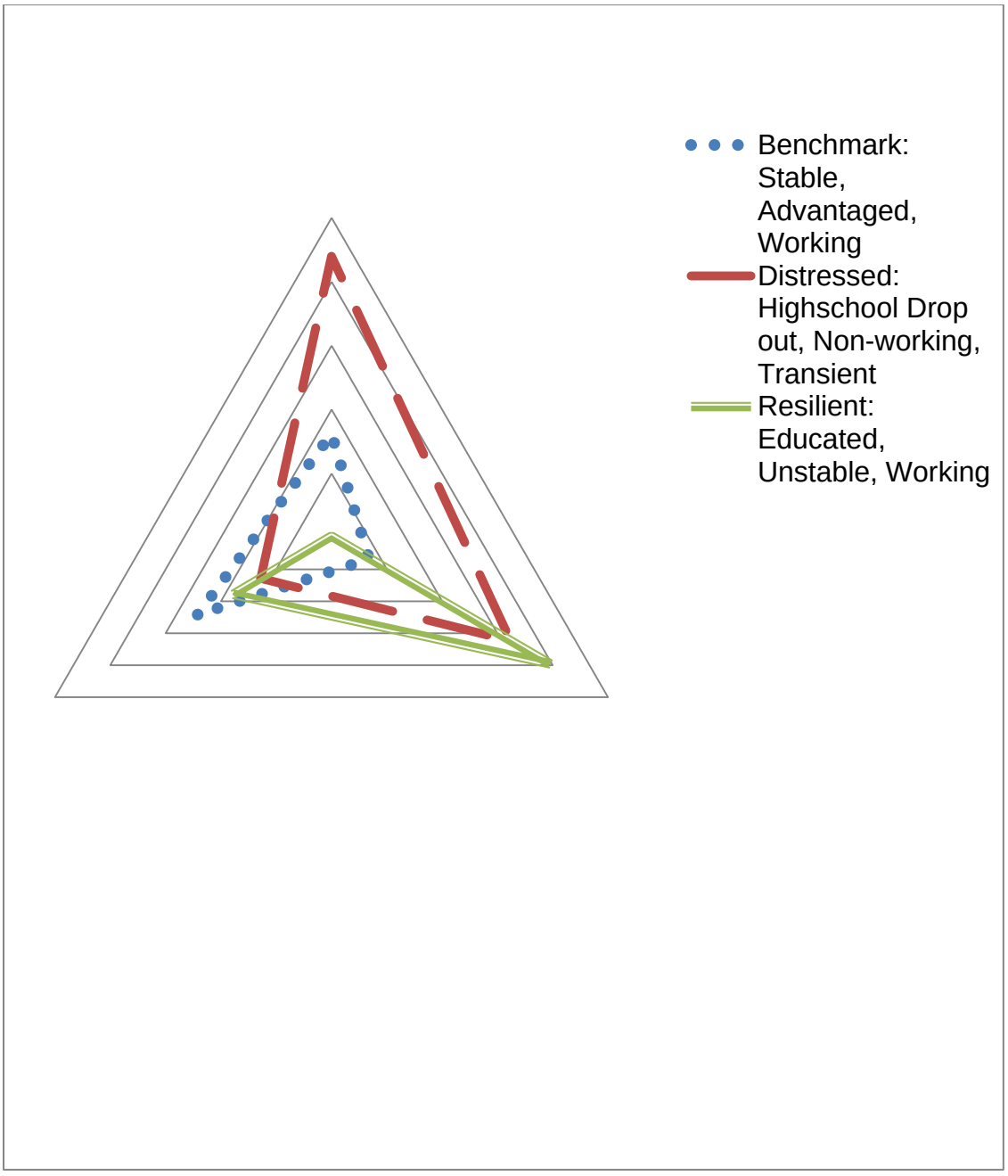

Figure 5. Block-group types and mean factor scores for each dimension of neighborhood socioeconomic ecology.

Note. For interpretation of the references to color in this and all other figures, the reader is referred to the electronic version of this dissertation.

Measurement III: Gender (Independent Variable)

Description. Gender was coded as male (1) and female (0) based on the juveniles self-report. Females (0) were used as the reference group in the model because it is expected that they had a lower rate of recidivism/longer survival time than males.

Rationale for Variable. Gender was used to further understand gender differences that may influence the impact the time to recidivism. Given that research has found that gender differences do exist when identifying the onset of initial crime as well as showing differential predictive validity when determining future recidivism. This variable was used to further determine gender differs as it relates to time to future recidivism across and within community context (Onifade, Davidson, Campbell, 2009; Kroneman, Loeber, & Hipwell, 2004; Chesney- Lind & Sheldon, 2004; Gottfredson, McNeil, & Gottfredson, 1991). This accounted for any potential effects gender has on time to recidivism and how these patterns differed across community context.

Measurement VI: Race (Independent Variable)

Description. Race was divided into two groups. Group 1 was based on those juvenile who identified themselves as White/Caucasian (0) upon entry of the court. Group 2 included those who self-identified as African American, Latino, Mixed Race, and Other. This group represents all juveniles of color. For purposes of this study, all of these individuals were categorized as Non-whites. Whites served as the reference group (0) in model because based on previous studies, since it is expected that Whites had reduced recidivism/longer survival time before failure/time to recidivism.

Rationale for Variable. Much of the research on juvenile recidivism confirms a disparity among non-White /Minority offenders (e.g. African Americans) often come in contact with juvenile recidivism at different rates due to factors such as racial profiling, policing, increased surveillance, biased risk assessments, the increased exposure to distressed environments, and biases that happen across neighborhoods (i.e. housing policies) (Onifade, Davidson, Campbell, 2009; Schwalbe, Fraser, Day, Cooley, 2006; Sever, 2003; Sampson, Morenoff, & Gannon-Rowley, 2002; Levanthal & Brooks-Gunn, 2000; Wikstrom & Loeber, 2000 etc.). As result, this study controlled for race (White/ Non-White) as a means to further explore the extent to which race impacted time to recidivism. What has yet to be determined is how race varies across community context. This study explored whether minorities in general have the same experiences as it relates to time to recidivism regardless of neighborhood context. These becomes important in exploring the extent to which a juvenile's socioeconomic environment, which is characterized by the juvenile's neighborhood typology, may increase or decrease the likelihood of coming in contact with the court even when race is accounted for.

Measurement V: Recidivism- Time to Recidivism and Yes/No Recidivism (Dependent Variable)

Juvenile recidivism was measured using two dimensions or properties. The first property is actual recidivism observed based on juvenile court petitions. The final property was the amount of time/in days a juvenile survived outside of the court system until failure (reoffending) or censorship. A description of these two dimensions is below.

Recidivism Petition Description. Recidivism was defined by courts receiving any new petition after the original offense and was dichotomized as a yes/no variable. These data were based on archival court records which identified any new court petitions the youth received post initial contact with the juvenile court. Adult data bases were used to examine recidivism for all juveniles who are 17+ years of age and are currently in the adult system (for this court youth over 17 are considered adults). This adult data base allows for continued observation of recidivism for juveniles who age out of the juvenile court system. This variable is coded as yes (1) and no (0). The response no (0) served as the reference group in the model.

Rationale for Variable. The most common approach to determining recidivism is through the evaluation of court petitions that occur once a juvenile has by the court due to some allegation of a juvenile offense. The use of petitions is one of the most utilized approaches to appropriately determined official recidivism (Maltz, 1984).

Time to Recidivism Description. In addition to measuring recidivism by yes (1) and no (0), time to recidivism is an additional measure which reflects the number of days until the occurrence of any new petition after the juvenile's original charge. This variable captures the trajectory of juvenile offending. The study start date for each juvenile was the date he/she entered the court system for the first time. These dates ranged from 07/08/2004 to 08/30/2010.

Rationale for Variable. These variables are necessary for determining trajectory of juvenile offending have been used in survival analyses to examine criminal history across juveniles and juvenile subgroups (i.e. Cox Proportional Hazard Models) and have been deemed among the better approaches to capturing patterns of offending

(Hosmer & Lemeshow1999; Dejong, 1997; Visher, Lattimore, Linster, 1991; Greenwald & West, 1989; Maltz, 1984).

Capturing time to recidivism as defined by failure, in this case a new formal court petition, has been suggested to be among the best approached to capture a dynamic phenomenon like juvenile recidivism (e.g. Hosmer & Lemeshow, 1999; Dejong, 1997; Visher, Lattimore, Linsters, 1991). Often times in literature, juvenile recidivism is treated as a static variable based on a set time point. Now it is recommended to examine/measure recidivism by time period versus yes/no recidivism. This method which is most commonly used in biomedical research to predict treatment of failure/mortality rates is deemed the best approach to capturing the trajectory of an event (Hosmer & Lemeshow, 1999 & Dejong, 1997).

Chapter 6: Results

Analysis Strategy

Survival Analysis/Cox Proportional Hazard Models. As community psychologists, it is essential to apply multilevel methods to examine multilevel theories (Luke, 2005). In this case, theories of juvenile reoffending were examined. Multilevel survival models provided an opportunity to explore juvenile delinquency from an ecological perspective. This perspective highlights how individual-level, micro-level, and macro-level characteristics jointly impact patterns of recidivism. This modeling method was adopted to better understand the complexity of juvenile recidivism by incorporating Juvenile Court Officer (JCO) reports, archival recidivism data, and archival census data.

To answer the research questions this study utilized a series of survival analyses known as Cox Proportional Hazard Models (Therneau, 2012; Therneau, Grambsch, & Pankratz, 2003; Ripatti, & Palmgren, 2000; Hosmer & Lemeshow, 1999) (using SPSS and R software). The program used for this analysis, “coxme” (Therneau, Grambsch, & Pankratz, 2003; Ripatti, & Palmgren, 2000), captured both the hazard/risk for recidivism and actual recidivism among a sample of juvenile probationers. More specifically, these tests provided the probability of recidivism across each of the 161 neighborhoods and 3 neighborhood types.

Unlike traditional regression models, survival models properly account for censoring, which occurs when the study ends at an arbitrary time and it is unknown whether a juvenile recidivated after the study’s end time. Additionally, the dependent variable in a hazard is two-fold. The dependent variable accounts for whether an event occurs, and when it occurs (i.e. time to either event or censoring). For this study, the

dependent variable/outcome reflected yes/no if a juvenile recidivated during the study time frame (i.e. occurrence) in addition to the number of days each juvenile survived before recidivism or the study's end date (i.e. time). Given the sensitivity of this multilevel model to time and the need to estimate risk for recidivism, the Cox Proportional Hazard Models were a sensible method to address research questions.

Centering. Centering is a scaling technique used to interpret multilevel models and explain how Level-1 predictors (individual characteristics) perform across Level-2 predictors (neighborhood type) and determines if differences observed are a function of between group differences (Paccagnella, 2006; Raudenbush & Bryk, 2002). There are two types of centering that can be considered in multilevel models. First, there is grand mean centering and second, there is group mean centering. For this study, we used both grand and group mean centering.

Grand-mean centering involves adjusting the parameter estimates to reflect both person-level effects and compositional effects. In other words, this statistical strategy controls for the variance in individual level predictors (i.e. risk group, race, and gender) to better assess the effect of the Level-2 predictors (i.e. neighborhood type) in the model. According to Hoffman (1998),

> When grand mean centering is adopted, the variance in the intercept term represents the between group variance in the outcome measure adjusted for the level-1 predictor(s). Therefore, with this approach, the level-2 regression coefficients represent the group level relationship between the level-2 predictor and the outcome variable less the influence of the level-1 predictor(s). (p. 628)

Question 2 used grand mean centering to examine the main effect of neighborhood type on recidivism after controlling for risk group, race, and gender. In general, grand mean centering is a technique that does not change the magnitude of the coefficients observed, but impacts the magnitude of the intercept, which determines the outcome when the model predictors are set to zero (Paccagnella, 2006; Raudenbush & Bryk, 2002). However, for this study, the magnitude of the intercept has a slightly different interpretation because Level-1 predictors were transformed into dummy codes. When Level-1 predictors are dummy coded, the intercept represents the estimate for a person from the reference group, which has a value of 0 on all the dummy-coded indicator variables.

On the other hand, group mean centering was used to test the cross level interactions between neighborhood type and Level-1 predictors (Enders & Tofighi, 2007). According to Hoffman (1998),

> When group mean centering is adopted, the level-1 intercept variance is equal to the between group variance in the outcome measure. As a result, the level-2 regression coefficients, under group mean centering, simply represent the group level relationship between the level-2 predictor and the outcome variable of interest (i.e., the relationship between the level-2 predictor). (p. 628)

This method was used for Questions 3, which examined the moderating effect of neighborhood type on gender and recidivism, and Question 4, which examined the moderating of neighborhood type on risk group and recidivism. Similar to Question 2, Level-1 predictors were dummy coded. In group centered models, dummy coded Level-

1 represented the estimates for a person who has an average score on the level 1 predictor.

In both cases centering provided estimates of unbiased slopes and seemed sensible given the desire to make conservative inferences about neighborhood context that were independent of individual-level differences (i.e. within group differences). Guidelines for centering were based on recommendations from former research and decisions were made based on the nature of research Questions 2-4 (Paccagnella, 2006; Raudenbush & Bryk, 2002; Enders & Tofighi, 2000; Hofman & Gaven, 1998).

Moderator Analyses. Previous studies have identified many macro-level factors that considerably impact delinquency, particularly socioeconomic indicators (Onifade et al., 2011; Fackler & Johnson, 2010; Pratt & Cullen, 2005; Sampson, Morenoff, & Gannon-Rowley, 2002; Levanthal & Brooks- Gunn, 2000). Results from these studies consistently indicated that poverty potentially influences the magnitude of individual risk and delinquency (Onifade et al., 2011 Sampson, Morenoff, & Gannon-Rowley, 2002; Levanthal & Brooks- Gunn, 2000). What is still unknown is the degree to which these variables impact risk (Onifade et al., 2011). The goal of this study was to determine if neighborhood type (i.e. Distressed, Resilient, and Benchmark) moderated the relationship of risk and recidivism. The overall moderating effect of neighborhood type was tested in the final research question (Question 4).

Likelihood-Ratio Test/Chi Square Analysis. Chi square analyses were used to compare study models (Petras, Masyn, Buckley, Ialongo, & Kellam, 2011). This test, known as the Likelihood-Ratio Test, is a test of model fit. For Questions 1 and 2, the

Likelihood-Ratio Test determined if adding neighborhood type to the model significantly accounted for the effect of neighborhood on the intercept. For Questions 3 and 4, the Likelihood-Ratio Test determined if the moderating effect of neighborhood type accounted for the between-neighborhood random variation in the effects of Level-1 predictors, such as gender and risk group.

Overall, the Likelihood-Ratio Test compared simple and complex models to determine if the additional fixed effects in the complete models (i.e. the models that specify neighborhood type or the interaction between risk and neighborhood type) explain part of the random effect of neighborhood. The results of these tests' *p*-values represented if neighborhood type (Questions 1 and 2) and/or the moderating effect of neighborhood type (Questions 3 and 4) significantly accounted for the random variability observed across neighborhood as it related to recidivism. If the difference was significant, the null hypothesis was rejected and it was concluded that the expanded model significantly contributed to the effect of neighborhood. This test of model fit has been used in previous research which has also aimed to measure the random effects of Level-2 variables (Petras, Masyn, Buckley, Ialongo, & Kellam, 2011).

Main Effects across Level-1 Predictors. For this study, Level-1 predictors included the juvenile's risk group, race, and gender. Since it was expected that low-risk White female juvenile offenders would have the lowest rate of recidivism as compared to their counterparts, this group was used as the reference group in the sample. While main effects of Level-1 predictors (risk group, race, and gender) were not the focus of this study, these main effects were reported across each of the research questions (Questions 2-4).

Descriptive Exploratory Section

Prior to analyzing the research questions we conducted some exploratory descriptive analysis concerning neighborhood type and recidivism. As shown on Table 3, most juveniles in the sample lived in the Resilient neighborhood type N=401). Furthermore, of the 54% of juveniles who recidivated across the total sample, 27% of the recidivists were from the Resilient neighborhood type. Additionally, juveniles within the Resilient neighborhood type also had a higher proportion of males and Non-White offenders than Benchmark and Distressed neighborhood types.

Table 3

Descriptives of Risk Group Across Neighborhood Typology

	Total Number of Juveniles	Total Number of Recidivists	Risk Group	Race	Gender
Distressed	N = 174	N = 80	Low = 56 Enviro = 39 Fam = 29 High = 50	White = 99 Non- White = 75	Male = 137 Female = 37
Resilient	N = 401	N = 241	Low = 109 Enviro = 103 Fam = 73 High = 116	White = 88 Non- White = 313	Male = 294 Female = 107
Benchmark	N = 318	N = 160	Low = 94 Enviro = 69 Fam = 59 High = 96	White =168 Non- White = 150	Male = 235 Female = 83

Note. For risk group, Low represents Low Risk; Enviro represents Environmental Needs (Moderate Risk); Fam represents Family Needs (Moderate Risk); and High represents High Risk.

Additionally, descriptive analyses were completed to observe recidivism rates across neighborhood type on each of the Level-1 predictors (i.e. risk group, race, and gender) in the study. As shown on Figure 6, juveniles from the Resilient neighborhood

typology had the largest proportion of recidivist across low-, moderate-, and high-risk groups. Descriptive analyses were also completed to examine recidivism rates by race (i.e. White/Non-White). As shown on Figure 7, of those juveniles who recidivated (n = 481), the largest proportion of White recidivists were from the Benchmark neighborhood type and the largest proportion of Non-White recidivists were from the Resilient neighborhood type. Furthermore, as shown on Figure 8, males accounted for the largest proportion of recidivists (n = 374) and were mostly from the Resilient neighborhood type. See Figures 6-8 below for more details.

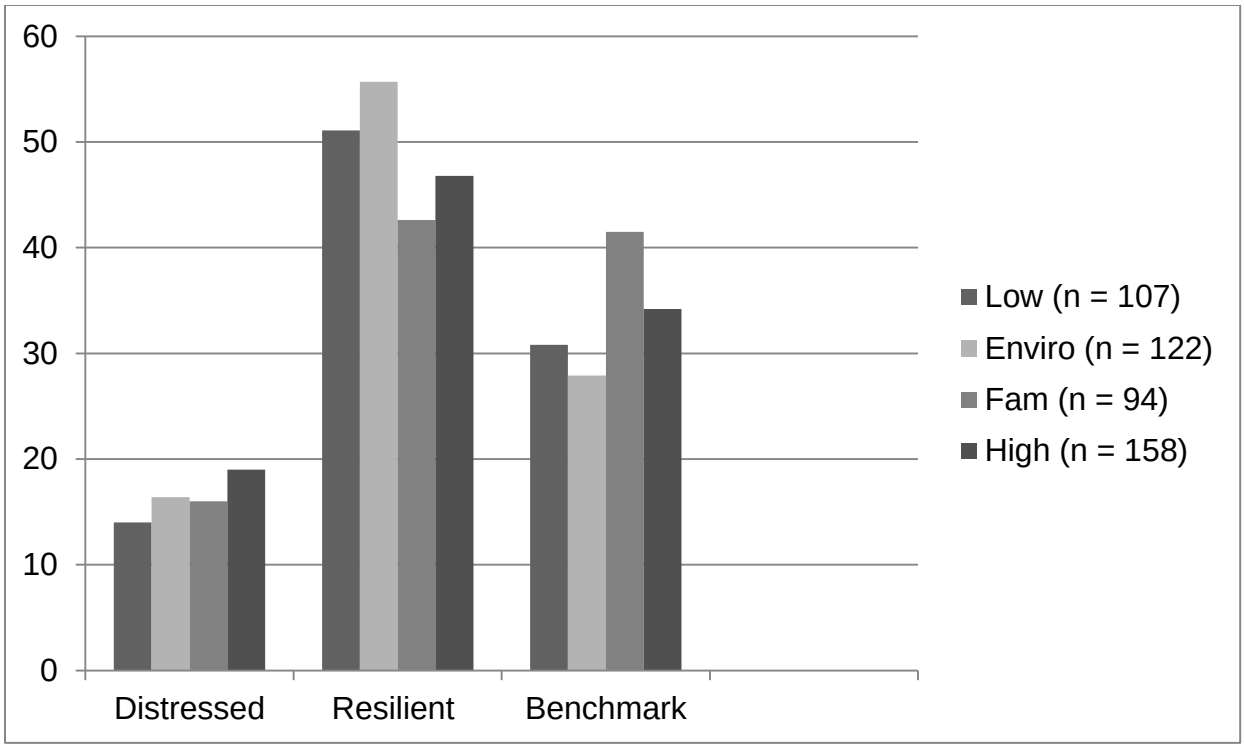

Figure 6. Percentage of recidivist by risk group.

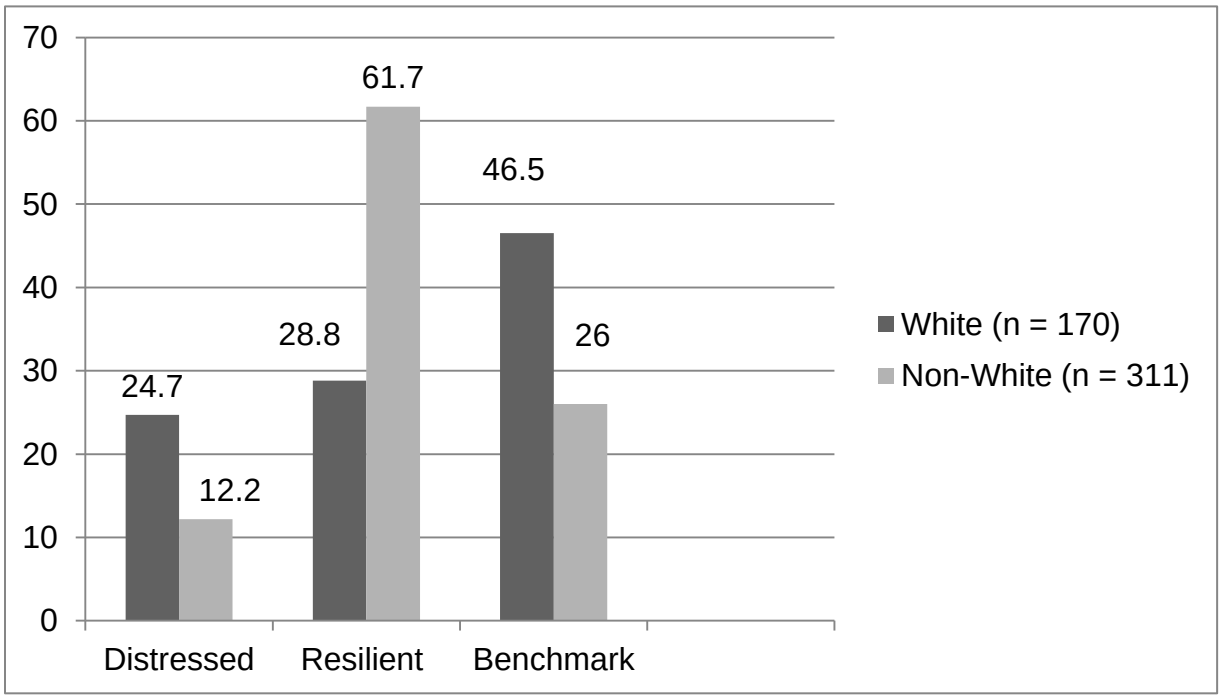

Figure 7. Proportion of White and Non-White recidivist by neighborhood type.

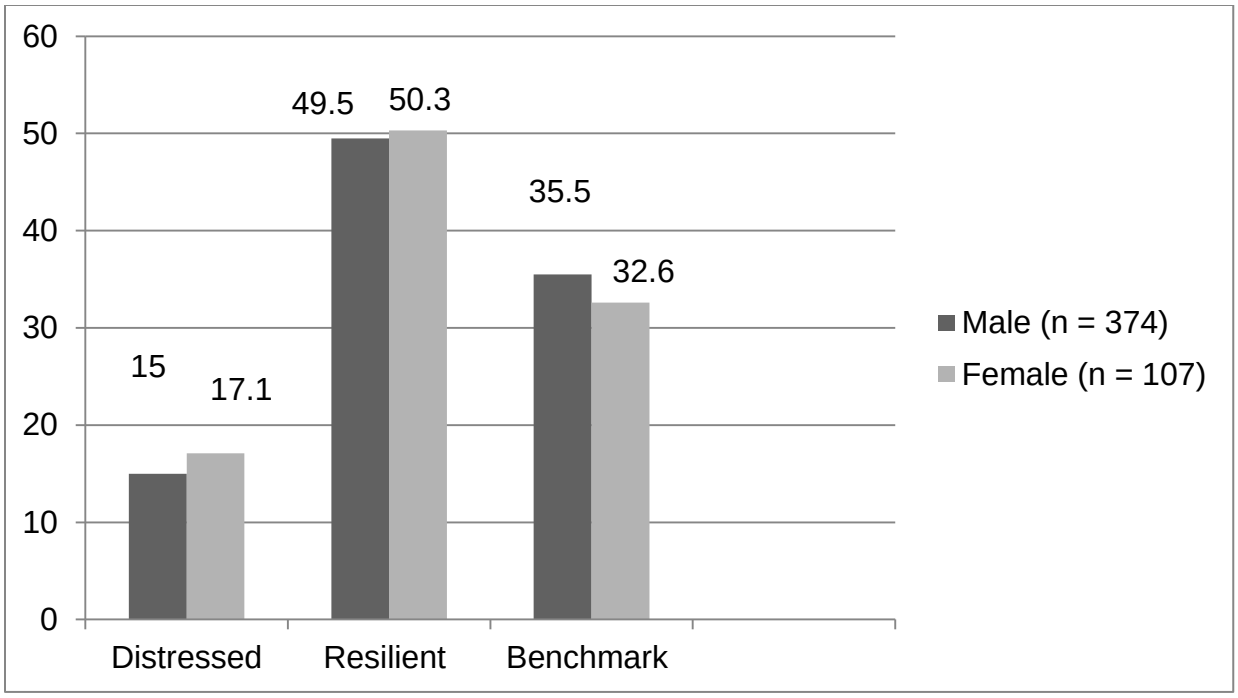

Figure 8. Proportion of male and female recidivists by neighborhood type.

Question 1. What is the main effect of neighborhood type on recidivism?

To answer Question 1, (what is the main effect of neighborhood type on recidivism), Models 1 & 2 were tested using a Cox Proportional Hazard Model. Model 1 estimated the baseline hazard/risk for recidivism for each juvenile and further estimated how much risk varied by neighborhood as determine by Census block groups (see Table 4). Model 2, as shown on Table 4, provided an estimate of how much of the random neighborhood effect was explained by neighborhood type. Finally, a Likelihood-Ratio Test was used to determine how much of the variance of neighborhood was explained by neighborhood type.

For Question 1, the Likelihood-Ratio Test found that a significant proportion of the effect of neighborhood was explained by the type of neighborhoods juveniles lived in (chi-square = 8.37, $df = 2$, $p < .05$). As shown on Table 4, the fixed effects in the model

revealed that while juveniles who lived in the Distressed neighborhoods were not significantly different from juveniles who lived in Benchmark neighborhoods in terms of their risk for recidivism (β= -.06, p > .05, OR = .94), juveniles who lived in Resilient neighborhoods were at greater risk for recidivism than those juveniles in Benchmark neighborhoods (β = .24, p < .05, OR = 1.27).

Furthermore, the estimate from Model 1 (variance = 8.24e-05, *sd* = 9.08e-03), revealed that the random variance associated with the intercept term significantly decreased in Model 2 (the model that specified neighborhood type) (variance = 8.19e-05, *sd* = 9.05e-03) suggesting that neighborhood type accounted for a significant amount of the variance observed across neighborhoods. Since the Likelihood-Ratio Test suggested a significant difference, we furthered compared the variance of both models to determine the degree of change across Models 1 and 2. Although the variance difference was small to start (.0000824 - .0000819), neighborhood type explained .61% of the random variance in the intercept.

Table 4

Results from the Cox Proportional Hazard Model (Models 1 and 2) which Examined the Main Effect of Neighborhood Type on Recidivism

Model 1	*Estimated Baseline Hazard and Variability of Neighborhood*					
Fixed Effect		Coefficient	*OR*	*SE*	*z*	*p*-value
		____	____	____	____	____
Random Effect		Variance	*SD*			
	Intercept	8.24e-05	9.08e-03			
Model Fit						
	Measure	Chi-square	*df*	*p*-value	*AIC*	*BIC*
	Integrated Log-likelihood	0.00	1.00	*p*>.05	-2.00	-6.18
Model 2	*Estimated Baseline Hazard and Variability of Neighborhood Type*					
Fixed Effect		Coefficient	*OR*	*SE*	z	*p*-value
Neighborhood Type						
	Distressed	-.06	.94	.14	-.43	*p*>.05
	Resilient	.24	1.27	.10	2.37	**p*<.05
Random Effect		Variance	*SD*			
	Intercept	8.19e-05	9.05e-03			
Model fit						
	Measure	Chi-square	*df*	*p*-value	*AIC*	*BIC*
	Integrated Log-likelihood	8.37	3.00	**p*<.05	2.37	-10.16

Note. (*OR*)= represents the *Odds Ratio* or *exp (coef).* (*) indicates $p < .05$.

Question 2. What is the effect of neighborhood type on recidivism when controlling for race, gender, and risk group?

A Cox Proportional Hazard Model was used to examine the random effect of neighborhood type on recidivism when controlling for risk group, race, and gender (Models 3 & 4). Model 3 estimated the baseline hazard/risk for recidivism for each juvenile and determined the random effect neighborhood, if varied, when controlling for race, gender, and risk group. As shown on Table 5, Model 4 provided an estimate of how much of this random neighborhood effect can be explained by the type of neighborhood that juveniles lived in at the time of their first offense. Finally, a Likelihood-Ratio Test was used to determine model fit.

As shown on Table 5, the fixed effects of the baseline model which estimated hazard and variability of neighborhood when controlling for race, gender, and risk group found that Environmental Needs (moderate-risk group) (β = .56, p < .001, OR = 1.76), Family Needs (moderate-risk group) (β = .57, p < .001, OR = 1.76), and High Risk (β = .56, p < .001, OR = 1.28), juveniles were at higher risk for recidivism than Low Risk offenders. Also shown on Table 5, both males (β = .32, p< .001, OR = 1.38) and Non-White offenders (β = .25, p < .001, OR =1.28) were at higher risk for recidivism than their female and White counterparts.

For Question 2, the Likelihood-Ratio Test found that neighborhood type did not significantly account for the effect of neighborhood (chi-square = 4.27, df = 2, p > .05) when controlling for risk group, race, and gender. As shown on Table 5, unlike Question 1, the fixed effects revealed that regardless of whether juveniles lived in Distressed (β = -.04, p > .05, OR = .96) or Resilient neighborhood types (β = .18, p >

.05, *OR* = 1.20), the significance of neighborhood type disappeared when we controlled for risk group, race, and gender. Results indicated that the variance for Model 3 (variance = 8.31e-05, *sd* = 9.12e-03) was not significantly different (did not significantly decrease) from the observed variance observed for Model 4 (variance = 8.25e-05, *sd* = 9.08e-03) (See Table 5).

Table 5

Results from the Cox Proportional Hazard Model (Models 3 and 4) which Examined the Effect of Neighborhood Type on Recidivism when Controlling for Race Gender, and Risk Group

Model 3	*Estimated Baseline Hazard and Variability of Neighborhood when Controlling for Race, Gender, and Risk Group*					
Fixed Effect		Coefficient	*OR*	*SE*	*z*	*p*-value
	Environmental Needs	.56	1.76	.132	4.24	***p*<.001
	Family Needs	.57	1.76	.14	3.99	***p*<.001
	High Risk	.56	1.74	.13	4.43	***p*<.001
	Male	.32	1.38	.11	2.90	***p*<.001
	Non-White	.25	1.28	.10	2.62	***p*<.001
Random Effect		Variance	*SD*			
	Intercept	8.13e-05	9.11e-03			
Model Fit						
	Measure	Chi-square	*df*	*p*-value	*AIC*	*BIC*
	Integrated Log-likelihood	43.36	6.00	***p*<.001	31.36	6.30

Table 5 (cont'd)

Model 4	*Estimated Baseline Hazard and Variability of Neighborhood Type when Controlling for Race, Gender, and Risk Group*					
Fixed Effect		Coefficient	*OR*	*SE*	*z*	*p-value*
	Distressed	-.04	.96	.14	-.29	$p > .05$
	Resilient	.18	1.20	0.11	1.73	$p > .05$
	Environmental Needs	.56	1.74	.13	4.18	$^{**}p < .001$
	Family Needs	.57	1.76	.42	3.99	$^{**}p < .001$
	High Risk	.55	1.73	.13	4.37	$^{**}p < .001$
	Male	.33	1.39	.11	3.00	$^{*}p < .05$
	Non-White	.19	1.20	.10	1.84	$p > .05$
Random Effect		Variance	*SD*			
	Intercept	8.25e-05	9.08e-03			
Model fit						
	Measure	Chi-square	*df*	*p*-value	*AIC*	*BIC*
	Integrated Log-likelihood	47.63	8.00	$^{*}p<.05$	31.63	-1.78

Note. Benchmark neighborhood was used as the reference group. (*OR*)= represents the *Odds Ratio* or *exp (coef).* (*) indicates $p < .05$ and (**) indicates $p < .001$. Level-1 predictors were grand mean centered.

Question 3. Is there a moderating effect of neighborhood type on the relationship between gender and recidivism?

Question 3 was an exploratory/preliminary question that examined the potential interaction between neighborhood type and gender. Accounting for the potential moderating effect of neighborhood on gender enabled us to inform the full/completed

model (Question 4). The potential interaction between neighborhood type and gender was tested to determine if it should be included in the full model, which examined the moderating effect of neighborhood on risk and recidivism (Question 4).

As shown on Table 6, Question 3 explored the moderating effect of neighborhood type on the relationship between gender and recidivism using a Cox Proportional Hazard Model (represented by Models 5 and 6). These models examined the cross-level interaction of gender and neighborhood. Model 5 estimated the cross-level random slope of gender. Model 6 estimated how much of the randomness in the slope of gender was explained by the interaction between gender and neighborhood type. A Likelihood-Ratio Test compared the fit of the two models.

As shown on Table 6, the baseline slope estimated hazard of male offenders suggested that males are significantly higher risk for recidivism than their female counterparts (β = .54, p < .001, *OR* = 1.71). Furthermore, the Likelihood-Ratio Test for Question 3 found that the interaction between neighborhood type and gender did not significantly account for the random slope for gender (chi-square = 4.27, df = 2, p > .05). As shown on Table 6, the fixed effects in Model 6 show that the interaction between gender and neighborhood did not account for the effect of neighborhood type. Results suggested that the interaction of gender and Distressed neighborhoods (β = .-0.47, p > .05, *OR* = .62) and gender and Resilient neighborhoods did not account for a significant amount of the variance of neighborhood type (β = -.31, p > .05, *OR* = .74) (See Table 6). The variance for Model 5 was 1.24e-05 (*sd* = 3.52e-03) while the variance for Model 6 was 1.21e-04 (*sd* = 3.47e-05). Based on these results, the interaction of neighborhood and gender was not incorporated in the final model (Question 4).

Table 6

Results from the Cox Proportional Hazard Model (Models 5 and 6) which Examined the Moderating Effect of Neighborhood Type on the Relationship between Gender and Recidivism

Model 5	*Estimated Baseline Hazard and Variability of the Random Slope of Gender and Neighborhood Type*					
Fixed Effect		Coefficient	*OR*	*SE*	*z*	*p*-value
	Male	.54	1.71	.15	3.46	$p <$ .001**
	Distressed	.38	1.04	.22	.17	$p > .05$
	Resilient	.17	1.90	.15	1.18	$p > .05$
Random Effect		Variance	*SD*			
	Intercept	1.24e-05	3.52e-03			
	Male	2.44e-04	1.56e-02			
Model Fit						
	Measure	Chi-square	*df*	*p*-value	*AIC*	*BIC*
	Integrated Log-likelihood	14.56	5.00	*$p < .05$	4.56	-13.26

Table 6 (cont'd)

Model 6	*Estimated Baseline Hazard and Variability of the Random Slope of Cross-level Moderating Effect of Neighborhood Type and Gender*					
Fixed Effect		Coefficient	*OR*	*SE*	*z*	*p*-value
Neighborhood Type						
	Male	.79	2.20	.32	2.43	$p < .05$*
	Distressed	.70	1.07	.22	.31	$p > .05$
	Resilient	.20	1.21	.15	1.31	$p > .05$
	Male X Distressed	-.48	.61	.56	-.86	$p > .05$
	Male X Resilient	-.31	.73	.38	-.82	$p > .05$
Random Effect		Variance	*SD*			
	Intercept	1.21e-03	3.47e-.03			
	Male	2.72e-04	1.65e-02			
Model fit						
	Measure	Chi-square	*df*	*p*-value	*AIC*	*BIC*
	Integrated Log-likelihood	15.51	7.00	*$p < .05$	1.51	-23.45

Note. Benchmark neighborhood was used as the reference group. (*OR*)= represents the *Odds Ratio* or *exp (coef).* (*) indicates $p < .05$ and (**) indicates $p < .001$. Level-1 predictors were group mean centered.

Question 4. What is the moderating effect of neighborhood type on risk and recidivism?

A Cox Proportional Hazard Model was used to examine the moderating effect of neighborhood type on the relationship between risk group and recidivism (Question 4). This question was represented by Models 7 and 8. Model 7 estimated the random slopes for each of the four risk groups. Model 8 estimated the random slopes of the

interaction between risk group and neighborhood type. A Likelihood-Ratio Test was used to determine whether the random slopes of risk group (as shown Model 7) were explained by the cross-level interaction of risk group and neighborhood type (See Table 7).

As shown on Table 7, the fixed effects in Model 7 revealed that the Environmental Needs (moderate- risk group) (β = .72, p < .001, *OR* = 2.06), Family Needs (moderate- risk group) (β = .57, *p*<. 001, *OR* = 1.76), and High-Risk (β = .48, *p* < .001, *OR* = 1.61), juvenile offenders were at higher risk for recidivism than their Low-Risk counterparts. Also shown on Table 7, both males (β = .34, *p* < .05, *OR* = 1.40) and Non-White offenders (β = .61, *p* < .001, *OR* = 1.85) were at a significantly greater risk for recidivism than their White female counterparts.

The Likelihood-Ratio Test for Question 4 found that the interaction of risk group and neighborhood type did not significantly account for the effect of neighborhood type (chi-square = 11.84, *df* = 6, *p* > .05). As shown on Table 7, the fixed effects in the model revealed that the interaction between neighborhood type and risk group did not significantly account for the effect of living in a Distressed or Resilient neighborhood. As a result, regardless of whether a juvenile had Environmental Needs (moderate-risk group) in a Distressed neighborhood (β = .90, *p* > .05, *OR* = 2.46), Environmental Needs (moderate-risk group) in a Resilient neighborhood (β = .04, *p* > .05, *OR* = 1.04), Family Needs (moderate-risk group) in a Distressed neighborhood (β = -1.31, *p* > .05, *OR* = .27), Family Needs (moderate-risk group) in a Resilient neighborhood (β = -.77, p > .05, OR = .46), High Risk in a Distressed neighborhood (β = .36, p > .05, *OR* = 1.44), or High Risk in a Resilient neighborhood (β = .22, *p* >.05, *OR* = 1.25), neighborhood

type did not moderate the relationship between risk group and recidivism. In other words, the interaction between risk group and neighborhood type did not account for random slopes observed in the risk groups, such that, the variance for Model 7 (variance = 1.38e-04, *sd* = 1.18) was not significantly different from the variance observed in Model 8 (variance = 0.00, *sd* = .02) (See Table 7).

Table 7

Results from the Cox Proportional Hazard Model (Models 7 and 8) which Examined the Moderating Effect of Neighborhood Type on the Risk and Recidivism

Model 7						
Fixed Effect		Coefficient	*OR*	*SE*	*z*	*p*-value
	Environmental Needs	.72	2.06	.21	3.44	***p* < .001
	Family Needs	.57	1.76	.21	2.71	**p* < .05
	High Risk	.48	1.61	.18	2.67	**p* < .05
	Non-White	.34	1.40	.17	2.02	**p* < .05
	Male	.61	1.84	.16	3.79	***p* < .001
	Distressed	.07	1.07	.22	.31	p > .05
	Resilient	.18	1.19	.15	1.21	p > .05
Random Effect		Variance	*SD*			
	Intercept	1.38e-04	1.76e-02			
	Environmental Needs	3.40e-01	5.83e-01			
	Family Needs	1.86e-01	4.32e-01			
	High Risk	1.84e-05	4.29e-03			
Model Fit						
	Measure	Chi-square	*df*	*p*-value	*AIC*	*BIC*
	Integrated Log-likelihood	39.17	11.00	4.95e-05	17.17	-22.04

Table 7 (cont'd)

Model 8						
Fixed Effect		Coefficient	*OR*	*SE*	z	*p*-value
Neighborhood Type						
	Environmental Needs	.57	1.77	.42	1.35	*p* > .05
	Family Needs	1.14	3.14	.38	3.04	*p < .05
	High-Risk	.29	1.34	.39	.74	*p* > .05
	Non-White	.36	1.44	.17	2.15	*p < .05
	Male	.58	1.80	.16	3.67	**p < .001
	Distressed	.06	1.07	.23	.28	*p* > .05
	Resilient	.20	1.22	.15	1.35	*p < .05
	Environmental Needs X Distressed	.90	2.46	.70	1.29	*p* > .05
	Environmental Needs X Resilient	.04	1.04	.49	.09	*p* > .05
	Family Needs X Distressed	-1.31	.27	.77	-1.69	*p* > .05
	Family Needs X Resilient	-.77	.46	.45	-1.72	*p* > .05
	High Risk X Distressed	.36	1.44	.65	.56	*p* > .05
	High Risk X Resilient	.22	1.25	.45	.50	*p* > .05

Table 7 (cont'd)

Random Effect		Variance	*SD*			
	Intercept	.00	.02			
	Environmental Needs	.19	.43			
	Family Needs	.00	.05			
	High-Risk	.00	.02			
Model fit						
	Measure	Chi-square	*df*	*p*-value	*AIC*	*BIC*
	Integrated Log-likelihood	51.01	17.00	*$p < .05$	17.01	-43.59

Note. Benchmark neighborhood was used as the reference group. (*OR*)= represents the *Odds Ratio* or *exp (coef).* (*) indicates $p < .05$ and (**) indicates $p < .001$. Level-1 predictors were group mean centered.

Chapter 7: Discussion

The overall goal of this study was to examine the moderating effect of risk and recidivism. Neighborhoods were conceptualized by using US Census Block ID information to capture where juveniles lived and the socio-economic nature of these neighborhoods. Juveniles were classified in one of three neighborhoods, such as Distressed, Resilient, and Benchmark. It was expected that the Benchmark neighborhoods would have the lowest recidivism rates, because they were more stable and higher performing (e.g. they had higher graduation rates and income levels) than Distressed and Resilient neighborhoods. For this reason, we used juveniles in the Benchmark community as the reference group.

For the purpose of organization, we examined the moderating effect of neighborhood type in 4 stages. First, we examined the overall effect of neighborhood type on recidivism. Secondly, we examined the overall effect of neighborhood type when controlling for risk, race and gender. Third, we examined if there was a potential interaction between gender and neighborhood type. To finish, our final and full model, which is the primary focus of the study, examined if there was a cross-level interaction between risk and neighborhood type while controlling for risk group, race, and gender. These questions cumulatively provided a glimpse of the potential role of the interaction between socio-economic conditions on risk for recidivism.

What is the effect of neighborhood type on recidivism?

The first research question examined the main effect of neighborhood type on recidivism. The Cox Proportional Hazard Model suggested that neighborhood type significantly accounted for the random effect observed across neighborhood. More

specifically, these results suggested that those juveniles who lived in Resilient neighborhoods were at greater risk for recidivism than those who lived in the Benchmark neighborhoods. The variance went from .0000824 to .0000819, a small number to begin with. However, this variance decreased suggesting that neighborhood type explained .6% of the random variation in the intercept. Before making further conclusions about this observation, we conducted additional analysis to determine if this observation still holds up after controlling for individual-level characteristics (i.e. race, gender, and risk group).

What is the effect of neighborhood type on recidivism when individual-level factors such as race, gender, and risk group are controlled?

The second research question examined the main effect of neighborhood type on recidivism when controlling for race, gender and risk group. These results revealed that neighborhood type effects (observed in Question 1) disappeared once we controlled for race, gender, and risk group. This meant that neighborhood type did not significantly explain the random variation in the Model 3 intercept.

Furthermore, the basic simplified model (Model 3) also suggested that juveniles who were a part of the Environmental Needs, Family Needs, and High-Risk risk groups were more at-risk for recidivism than Low-Risk juveniles. Additionally, males and Non-Whites were at a higher risk for recidivating than females and White offenders.

Is there a moderating effect of neighborhood type on the relationship between gender and recidivism?

The third research question was a preliminary/exploratory question that was completed to determine if a significant interaction between neighborhood and gender

should be accounted for in the fuller model (Question 4). This question examined the moderating effect of neighborhood type on gender and recidivism. This question compared the slope of gender to the slope of the interaction of gender and neighborhood type to determine if the interaction between gender and neighborhood type significantly accounted for the random slope of gender. Results suggested that the interaction of neighborhood and gender does not account for the random slope of gender. While males were more at-risk for coming in contact with the court system than their female counterparts, there was not a significant interaction between gender and neighborhood type. For this reason, we did not account for this interaction in the full and final model (Question 4).

What is the moderating effect of neighborhood type on risk and recidivism?

The fourth and final question represented the study's full model. This question examined the moderating effect of neighborhood type on risk and recidivism. In order to determine the potential cross-level interaction between risk group and neighborhood, we compared the slope of the risk group to the slope of the interaction of risk group and neighborhood. Results suggested that juveniles were not at any greater risk for recidivism based on the type of neighborhood in which they lived (i.e. Distressed; Resilient; Benchmark). The random variance observed across each of the slopes for risk group effect did not significantly vary based on the type of neighborhood juveniles lived. Regardless if a juvenile lived in a Distressed or a Benchmark neighborhood they were not at greater risk for recidivism as compared to juveniles who lived in Benchmark neighborhoods.

Summary of Overall Findings

Overall, previous research has identified various individual-level characteristics that impact juvenile offending and/or participation in analogous behaviors (Hopwood et al., 2011; Piquero, 2008; Rhee & Waldman, 2002 etc.). Not surprisingly, accounting for these factors is beneficial to the prediction of recidivism and time at risk. Some of these individual-level characteristics involve abnormal personality traits (Hare, 2009), while other individual-level traits are reflected in social constructions such as race and gender (Onifade, Davidson, Campbell, 2010). One consistent theme concerning the impact of individual-level factors on behavior was that environment plays a role in individual-level outcomes (Fackler & Johnson, 2010; Pratt & Cullen, 2005). These larger environmental forces have also been found to shape and impact microsystems (Fackler & Johnson, 2010).

In this study, we attempted to capture these individual level phenomena through the use of measurements like race and gender that describe juvenile offenders. We also used the *Youth Level of Service/Case Management Inventory (YLS/CMI)*, which takes into account individual level phenomenon like personality, attitudes and behavior. Consistent with former literature, Model 2 which incorporated these individual-level predictors, suggested that they are helpful in describing those juvenile who are at risk for recidivism.

Furthermore, the *Youth Level of Service/Case Management Inventory (YLS/CMI)* measurement also specified potential risk posed by the juvenile's microsystem. Previous research has found that families that have increased problems, limited supervision, and parents who have a history of maltreatment were more likely to put juveniles at an increased risk as it related to healthy development (Denning & Homel,

2008; Schmidt, Hoge, & Gomes, 2005; Anderson, 2002 Cottle, Lee, Heilburn, 2001; Andrews et al., 1990). Additionally, poor relationships with peers, problems in school and family risk factors have been found to increase the chances of juveniles getting involved in criminal activity (Schmidt, Hoge, & Gomes, 2005). Given the strong relationship between these micro-level factors and future crime, we were able to account for these characteristics in our construction of risk group. And, consistent with former research, these risk factors show evidence of distinct patterns of risk for recidivism.

However, in our attempt to examine the role of neighborhood on risk and recidivism, this study revealed that neighborhood type did not account for the random effect of neighborhood type. Although theories have been useful in describing the ways in which neighborhoods impacted individuals through weakening social controls (Jensen, 2003), this study suggested that in our county of interest neighborhood types did not vary in their risk for recidivism.

One consistent link between neighborhoods and individual outcomes is that poverty is significantly correlated to involvement in the criminal justice system (Pratt & Cullen, 2005; Sampson, Morenoff, & Gannon-Rowley, 2002). For this reason, we used neighborhood type as a strategy to capture the socio-economic ecology of neighborhoods. Given the many proximal and distal factors that must be taken into account when understanding the pathways to offending, we believed that research may benefit from taking an ecological approach, that is, considering the individual-, micro-, and macro-system when addressing delinquency over time. For this study, we attempted to merge individual, micro-, and macro-level factors as measurements to

demonstrate a holistic understanding of recidivism trends. However, when we controlled for this interaction, the variance of neighborhood type did not account for the effect observed at the neighborhood level.

Nevertheless, there are three critical differences that made this study unique from former research. First, former studies which has examined how multilevel factors impact delinquency, has focused on the onset of delinquency but not recidivism. While studying the impact of environments on initial delinquency is useful in prevention, it does not provide information concerning the long-term impact of delinquency as it relates to the reoccurrence of crime. What is unknown is the extent to which environments become more essential to understanding recidivism. This research suggests that there may be other factors which contribute to the observation of recidivism far beyond the environment. For example, court personnel presort cases upon entry to court, court reporting and level of surveillance a juvenile receives once he/she is under the jurisdiction of the court, introduces major biases that may potentially impact recidivism. Such biases potentially hinder the ability to account for more macro-level forces in these models of recidivism.

Second, this study aims to account for differences in recidivism across a unique county. The sample in this study reflects Ingham County, a mid-western industrialized area in the state of Michigan. Juveniles within this particular county lived across 161 block groups in the Lansing community and were generally low to moderate risk for recidivism. Additionally, the Lansing community did not offer greatly in terms of context; this made it more difficult to detect potential neighborhood type effects. It is possible that these results may vary if study was conducted in another county. In other words, it

may well be that the relatively limited variability in context within this county may have served to reduce the probability of finding robust neighborhood effects.

Third, in this study we crossed three forms of measure. We used the Youth Level of Service/Case Management Inventory which reflected both juvenile self-report and Juvenile Court Officer (JCO)/Probation Officers reports. Next, we used recidivism records from archival court records. Finally, we incorporated block-group information from US Census records to identify where juveniles lived at the time of their initial crime. This US Census data was also used to determine the type of neighborhood a juvenile lived in, by capturing the socio-economic conditions within the neighborhood. These various sources were used to capture individual, micro-, and macro-level experiences of juveniles. While former research has focused on single-level measurements (i.e. self-report) or even two forms of measures (i.e. archival census and archival crime), this study attempted to merge three forms of methods, JCO report, recidivism, and census data, as the means to gain a holistic understanding of a juvenile's ecological experience.

The methodologies employed highlight unresolved questions concerning whether individuals shape neighborhoods, if neighborhoods shape individuals, and/or if these entities are measures of one another. This study brought into question the static and dynamic nature of neighborhoods. According to the ecological model, neighborhood effects are not phenomena that can be conceptualized from a "fixed" perspective or dichotomized in an "either or" fashion (Onifade et al., 2011; Bronfenbrenner, 1989/1979/1977). Instead, neighborhoods are a part of a fluid ecological system (Bronfenbrenner, 1989/1979/1977). The ecological perspective suggests that individuals

influence neighborhoods; neighborhoods impact individuals from the top down; and these trends simultaneously and interchangeably affect one another (Bronfenbrenner, 1989/ 1979/1977). As a result, these preliminary findings which were unable to detect neighborhood type differences warrant additional exploration.

The current study was challenging because it attempted to account for these fluid effects/processes and disentangle potential macro-level factors from individual-level and micro-level factors. To adequately account for this "top down" neighborhood effect, additional research is needed that attempts to tease out these macro-level phenomena over long time periods. For this study, a conservative strategy was adopted to suggest that the neighborhood type mattered independent of the composition/Level-1 variables. Given individual-level characteristics like race, gender, and risk group have been strong correlates found to predict future recidivism (Zimmerman & Messner, 2010; Onifade et al., 2008; Cottle, Lee, Heilburn, 2001), it was important to account for these characteristics in the model. While these results suggested that neighborhood type did not significantly moderate the relationship of risk and recidivism, this exploratory work provided some unique additions to current literature.

Limitations and Implications for Future Research

Data Based on Juveniles Residency at the Time of Initial Offense

The neighborhood data used for this study were based on where the juvenile lived during his/her initial offense. Since address information was not collected each time the juvenile reoffended, we were unable to determine whether each juvenile maintained the same residency throughout the study. However, we assumed that those juveniles who were more transient moved to neighborhoods that were comparable to

the socio-economic conditions of their previous neighborhoods. Future work should include the most current neighborhood information and census records to better examine the impact of neighborhoods on recidivism. Tracking the juvenile's changes in residence over time may also provide information concerning the long-term effects of transiency on delinquency or recidivism.

Sample Size

This pilot work was exploratory and included a small sample. As mentioned earlier, to address Question 4 (the complete model) which examined the moderating effect of neighborhood type on recidivism, the sample had to be reduced further and results were determined based on a subset of the data. To analyze this question only block groups which had at least one juvenile to represent each of the 4 risk groups were analyzed to appropriately estimate parameters for each of the risk groups. This subset led to the evaluation of about half of the original sample. It is expected that with increased sample size and the observation of additional block groups, these research questions can be further examined to explore the role neighborhood type plays on time to recidivism.

Defining Neighborhoods

This study defined neighborhoods utilizing block group information determined by US Census 2000 data. This measurement of neighborhood limited the ability to define and characterize neighborhoods according to the juvenile's perceptions of their neighborhood. However, using block group data provided distal-level information that captured systematic trends. These trends, particularly around socio-economic,

workforce, and school data, were based on the units by which the government and other social agencies analyzed and incorporated policy changes.

Future work should reexamine the concept of neighborhood. By redefining the geographical space which juveniles and their families conceptualize as their neighborhood, a more accurate understanding of neighborhood effects can be employed. While Census block group data did not always fit with how juveniles think about their neighborhoods, it is of primary importance to determine to what extent juveniles' concepts of their neighborhood differ from the geographic boundaries determined by US Census records. This would allow courts to further investigate the relationship between recidivism and environments.

Identification of Treatment Intervention and Juvenile Disposition Recidivism

The data utilized for this study were collected by the Juvenile Court and based on preset court protocols and procedures established prior to our study design. As a result, the level of information and data format was limited. For this reason, information concerning juveniles placed in residential treatment programs was not taken into account. Given the court aims to utilize community-based programs and/or services, we estimated that juveniles who participated in residential placement/out of state placement involved a small proportion of offenders (est. <20%).

Furthermore, additional information concerning potential interventions the juvenile received during their probation term was unavailable. These programs may indeed impact a juvenile's criminogenic risk, environment, and ultimately a juvenile's

likelihood of recidivating. The court within this county relies on dispositions which encourage a juvenile to stay within the community (e.g. diversion projects); incorporating this information may enhance future work.

It is important to note that whether a juvenile is placed in a residential program and/or a community based program, some juveniles still manage to recidivate and receive additional court petitions while under the court's jurisdiction. This observation of recidivism begins upon a juveniles first contact with the court system and takes into account recidivism/petitions received while under the jurisdiction of the court and after his/her release from probation. Although this data were difficult to secure, future research will look into acquiring these data. Given the diversity of programs available and the variations in treatment models/ program combinations juveniles receive, these analyses are contingent on obtaining observations that will take a few more years to access.

Centering

For this study we used group mean centering to examine the cross-level interaction of neighborhood on Level-1 predictors (i.e. Questions 3 and 4). Group mean centering is sometimes viewed as a conservative approach to analyze Level-2 variables because it removes the variance observed between groups. It is important to note that by removing individual differences, we may consequently reduce the variance observed in neighborhoods. While some may argue that individuals are the source and measure of neighborhood, by removing this variance, there is a chance that features of the neighborhood type construct was removed. This may have been reflected in the small variances reported in our study.

In this study, we believed that neighborhood and neighborhood type would have significant strong effects and larger variances. We also believed that neighborhood effects were independent of individual differences. As a result, we decided to center around group mean. Given our belief that neighborhood type moderates risk group, we wanted to make conclusions that suggested that this interaction is present and is not a function of individual differences. However, in the future, it may be necessary to examine these methods from an uncentered and centered perspective to gain a better understanding on the impact of “neighborhood differences” on recidivism.

Chapter 8: Conclusion

Defining risk through the use of risk assessment has been essential to moving Juvenile courts to utilizing more systematic decision making processes. The focus on person-centered models has enabled the courts to accurately identify both treatment needs and likelihood of recidivism. Nonetheless, results from this study have indicated relationship between risk and recidivism did not vary by neighborhood type.

This finding is preliminary, but is necessary to better identify the proximal and distal factors that impact this classification system of risk. While neighborhoods may impact initial crime/court contact, it is possible that additional acts of crime and overall recidivism are impacted by other factors (i.e. practitioners' decision-making). Additionally, research has also shown that much of the biases that are observed within the court system happen on the front end (assessment of initial risk, reporting, policing, surveillance, community cohesion etc.) (Onifade et al., 2008). It is possible that at the point at which juveniles come in contact with the court, other influences become important to understanding those factors which lead to longer survival times outside of the court system (i.e. treatment programs/interventions), which differ from the socioeconomic conditions within their neighborhood.

This it is not to say neighborhoods do not play a significant role in our understanding of recidivism. Instead, this study reminds us that understanding and measuring phenomena at an aggregate level is complex. Not only is difficult to tease apart Level-1 and -2 variables but it is also challenging to account for a phenomenon that involves both static and dynamic factors. While some variables are fixed (gender/race/ criminal history), other risk factors are continuously changing (i.e. position

activities, education outcomes, policies). This introduces many complexities and encourages the need to continue looking at these dynamic multilevel phenomena over time to further understand if neighborhood effects are more important at certain time points.

APPENDICES

APPENDIX A

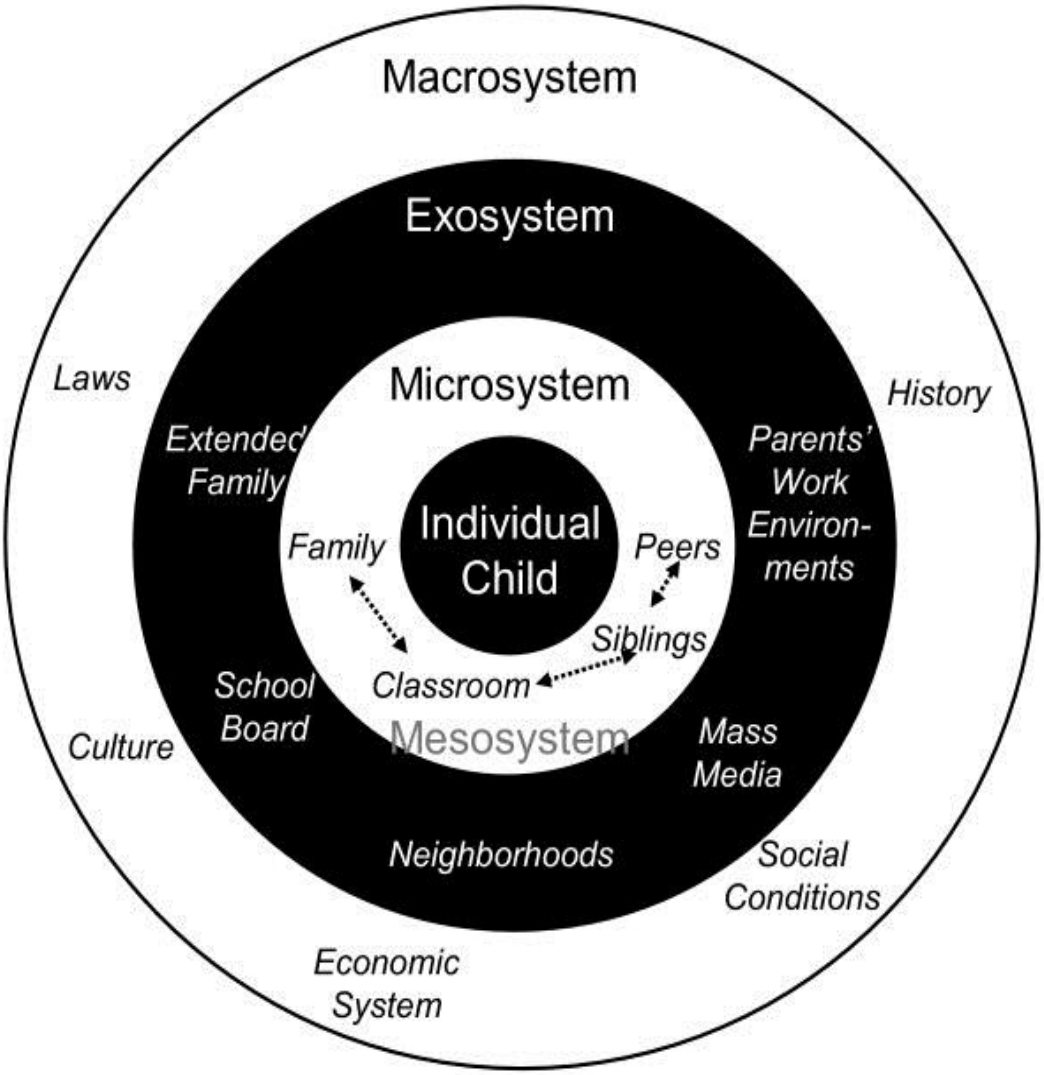

Figure 9. Bronfenbrenner's Ecological Model describing the set of nested environmental influences on a child.

Adopted from: Eisenmann *et al. BMC Public Health* (2008).

APPENDIX B

Youth Level of Service/Case Management Inventory (YLS/CMI) Survey/Domains and Individual Items

I. Prior and Current Offenses/ Disposition
   a) Three or More Prior Adjudications
   b) Two or More Failures to Comply
   c) Prior Probation
   d) Prior Detention
   e) Three or More Current Adjudications

II. Education
   a) Disruptive Classroom Behavior
   b) Disruptive Behavior on School Property
   c) Low Achievement
   d) Problems With Peers
   e) Problems With Teachers
   f) Truancy
   g) Unemployed/Not Seeking Employment

III. Leisure & Recreation
   a) Limited Organized Activities
   b) Could Make Better Use of Time
   c) No Personal Interests

IV. Peer Relations
   a) Some Delinquent Acquaintances
   b) Some Delinquent Friends
   c) No or Few Positive Acquaintances
   d) No or Few Positive Friends

V. Substance Abuse
   a) Occasional Drug Use
   b) Chronic Drug Use
   c) Chronic Alcohol Use
   d) Substance Abuse Interferes With Life
   e) Substance Abuse Linked to Offense(s)

VI. Family & Parenting
   a) Inadequate Supervision
   b) Difficulty in Controlling Behavior
   c) Inappropriate Discipline
   d) Inconsistent Parenting
   e) Poor Relations/Father-Child
   f) Poor Relations/Mother-Child

VII. Attitudes & Orientation
   a) Antisocial/Pro-Criminal Attitudes
   b) Not Seeking Help
   c) Actively Rejecting Help

d) Defies Authority
e) Callous/Little Concern for Others

VIII. Personality & Behavior

a) Inflated Self-Esteem
b) Physically Aggressive
c) Tantrums
d) Short Attention Span
e) Poor Frustration Tolerance
f) Inadequate Guilt Feelings
g) Verbally Aggressive/Impudent

APPENDIX C

The *Youth Level of Service/Case Management Inventory (YLS/CMI)* Risk Groups and Cluster Description

Table 8

Sample Size across YLS/CMI Cluster Type

Cluster Type Name	Negligible Risk	Environmental Risk	Family Needs	High Risk With and Without Criminal History	Total
Risk Level	Low Risk	Moderate Risk	Moderate Risk	High Risk	
Cluster Type Size	N=259 29.00%	N= 211 23.60%	N=161 18.00%	N=262 29.30%	N=893 100%

APPENDIX D

General Sample Descriptive Statistics

Table 9

Proportion of Male and Female in Sample

	Frequency	Percent	Valid Percent	Cumulative Percent
Female	227	25.4	25.4	25.4
Male	666	74.6	74.6	100.0
Total	893	100.0	100.0	

Table 10

Proportion of White and Non-White Juveniles

	Frequency	Percent	Valid Percent	Cumulative Percent
White	355	39.8	39.8	39.8
Non-White	538	60.2	60.2	100.0
Total	893	100.0	100.0	

Table 11

Proportion of Juveniles across Risk Group/Cluster Type

	Frequency	Percent	Valid Percent	Cumulative Percent
Negligible- Low Risk	259	29.0	29.0	29.0
Environmental Needs- Moderate Risk	211	23.6	23.6	52.6
Family Needs- Moderate Risk	161	18.0	18.0	70.7
High Risk	262	29.3	29.3	100.0
Total	893	100.0	100.0	

Table 12

Proportion of Juveniles who Recidivated in Year 1

	Frequency	Percent	Valid Percent	Cumulative Percent
No recidivism	585	65.5	65.5	65.5
Yes Recidivism	308	34.5	34.5	100.0
Total	893	100.0	100.0	

Note. Juveniles' time at risk for recidivism varied.

Table 13

Proportion of Juveniles who Recidivated between 1-2 Years

	Frequency	Percent	Valid Percent	Cumulative Percent
No recidivism	479	53.6	53.6	53.6
Yes Recidivism	414	46.4	46.4	100.0
Total	893	100.0	100.0	

Note. Juveniles' time at risk for recidivism varied.

Table 14

Proportion of Juveniles who Recidivated between 1- 3 Years

	Frequency	Percent	Valid Percent	Cumulative Percent
No recidivism	437	48.9	48.9	48.9
Yes Recidivism	456	51.1	51.1	100.0
Total	893	100.0	100.0	

Note. Juveniles' time at risk for recidivism varied.

Table 15

Proportion of Juveniles who Recidivated by Year 4

	Frequency	Percent	Valid Percent	Cumulative Percent
No recidivism	412	46.1	46.1	46.1
Yes Recidivism	481	53.9	53.9	100.0
Total	893	100.0	100.0	

Note. Juveniles' time at risk for recidivism varied.

APPENDIX E

Table 16

Means and Standard Deviations of Census Variable Descriptive Statistics used in the characterization of Neighborhood Type

Variable	Mean	SD
% single parent household	22.1	13.5
% non-White	23.9	18.5
% no high school diploma	15.5	1
% male - no high school diploma	16.5	1.1
% female - no high school diploma	14.6	1
% residents not participating in labor force - over 16	32.3	6.5
% male - residents not participating in labor force - over 16	26	7.3
% female - residents not participating in labor force - over 16	36	8.4
% households receiving public assistance	4.8	5
% households with ratio of income to poverty less than one	14.3	10.9
Vacancy rate	6	4.2
% households with more than 1 person per room	24.4	10.1
Rental rate	35.5	23.8
% households spending more than 30% of income on rent/mortgage	37.8	17.1

APPENDIX F

Neighborhood Descriptive Statistics

Table 17

Proportion of Juveniles within each Neighborhood Typology

Neighborhood Typology	Frequency	Percent	Valid Percent	Cumulative Percent
Benchmark	318	35.6	35.6	35.6
Distressed	174	19.5	19.5	55.1
Resilient	401	44.9	44.9	100.0
Total	893	100.0	100.0	

Table 18

Risk Group/Cluster Type by Neighborhood Type

Risk Group/Cluster Type	Benchmark	Distressed	Resilient	Total
Negligible- Low Risk	94	56	109	259
Environmental Needs-	69	39	103	211
Moderate Risk	59	29	73	161
Family Needs- Moderate Risk				
High Risk with and without	96	50	116	262
criminal history				
Total Number of Juveniles	318	174	401	893

Table 19

Percentage of Male and Female Offender across Neighborhood Typology

Gender		Benchmark	Distressed	Resilient	Total
Female	Count	83	37	107	227
	% within gender	36.6%	16.3%	47.1%	100.0%
	% within Neighborhood Typology	26.1%	21.3%	26.7%	25.4%
	% of Total	9.3%	4.1%	12.0%	25.4%
Male	Count	235	137	294	666
	% within gender	35.3%	20.6%	44.1%	100.0%
	% within Neighborhood Typology	73.9%	78.7%	73.3%	74.6%
	% of Total	26.3%	15.3%	32.9%	74.6%
Total	Count	318	174	401	893
	% within gender	35.6%	19.5%	44.9%	100.0%
	% within Neighborhood Typology	100.0%	100.0%	100.0%	100.0%
	% of Total	35.6%	19.5%	44.9%	100.0%

Table 20

Percentage of White and Non-White Juvenile Offenders across Neighborhood Typology

Race – White and Non-White		Benchmark	Distressed	Resilient	Total
White	Count	168	99	88	355
	% within White Non-White	47.3%	27.9%	24.8%	100.0%
	% within Neighborhood Typology	52.8%	56.9%	21.9%	39.8%
	% of Total	18.8%	11.1%	9.9%	39.8%
Non-White	Count	150	75	313	538
	% within White Non-White	27.9%	13.9%	58.2%	100.0%
	% within Neighborhood Typology	47.2%	43.1%	78.1%	60.2%
	% of Total	16.8%	8.4%	35.1%	60.2%
	Count	318	174	401	893

Table 21

Percentage of Risk Group/Cluster Type by Neighborhood Typology

Risk Group/Cluster Type		Benchmark	Distressed	Resilient	Total
Negligible-Low Risk	Count	94	56	109	259
	% within Risk Group/Cluster Type	36.3%	21.6%	42.1%	100.0%
	% within Neighborhood Typology	29.6%	32.2%	27.2%	29.0%
	% of Total	10.5%	6.3%	12.2%	29.0%
Environmental Needs-Moderate Risk	Count	69	39	103	211
	% within Risk Group/Cluster Type	32.7%	18.5%	48.8%	100.0%
	% within Neighborhood Typology	21.7%	22.4%	25.7%	23.6%
	% of Total	7.7%	4.4%	11.5%	23.6%
Family Needs-Moderate Risk	Count	59	29	73	161
	% within Risk Group/Cluster Type	36.6%	18.0%	45.3%	100.0%
	% within Neighborhood Typology	18.6%	16.7%	18.2%	18.0%
	% of Total	6.6%	3.2%	8.2%	18.0%
High Risk with and without criminal history	Count	96	50	116	262
	% within Risk Group/Cluster Type	36.6%	19.1%	44.3%	100.0%
	% within Neighborhood Typology	30.2%	28.7%	28.9%	29.3%
	% of Total	10.8%	5.6%	13.0%	29.3%

Table 22

Number of Juveniles across each Neighborhood Type and Total Number of Block Groups per Neighborhood Type

		Neighborhood Typology			Total
		Benchmark	Distressed	Resilient	
Number of Juveniles	1	13	13	2	28
	2	10	3	0	13
	3	11	7	3	21
	4	12	8	6	26
	5	7	2	1	10
	6	4	2	6	12
	7	3	1	7	11
	8	1	1	5	7
	9	2	1	2	5
	10	2	0	5	7
	11	2	2	1	5
	12	2	0	2	4
	13	0	0	3	3
	14	0	0	1	1
	15	1	0	1	2
	17	1	2	0	3
	18	0	0	1	1
	19	0	0	1	1
	28	0	0	1	1
Total Number of Census Block Groups Per Typology		71	42	48	161

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